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August 10, 2019

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Subject: July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup, PG&E Topock Compressor Station, Needles, California
(Document ID: TPK_Monthly_Progress_Rpt_July_2019_20190810_Final)

Dear Ms. Innis and Mr. Yue:

In compliance with the *1996 Corrective Action Consent Agreement* (CACA) (Attachment 6, Part E, Section 9a and Attachment 7) and the *2013 Remedial Design/Remedial Action Consent Decree* (CD) (§32 and Appendix C, Section 5), and pursuant to the *Construction/ Remedial Action Work Plan* (C/RAWP) (Section 2.6.3.1), this monthly report describes activities taken at Pacific Gas and Electric Company's (PG&E's) Topock Compressor Station during July 2019 as well as activities planned for the next six weeks (August 4 through September 14, 2019), and presents available results from sampling and testing performed in July 2019.

In addition, this report discusses material deviations from the approved design documents and/or the C/RAWP, if any, that PG&E has proposed to the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior (DOI), or that have been approved by DTSC and DOI. This report also highlights key personnel changes, if any, and summarizes activities performed and activities planned in support of DOI's 2012 Community Involvement Plan and DTSC's 2019 Community Outreach Plan, as well as contacts with the local community, representatives of the press, and/or public interest groups, if any. This report also includes data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection, as required by the Condition of Approval # xi in DTSC's approval letter dated August 24, 2018.

Please note that since activities conducted to comply with the project's Applicable or Relevant and Appropriate Requirement (ARARs) and the Subsequent Environmental Impact Report (SEIR) mitigation measures are currently reported in separate compliance reports, this information is not repeated in the monthly reports.

Monthly progress reports will be submitted to DTSC and DOI by the 10th day of the following month during construction and start-up of the groundwater remedy at the Topock Compressor Station which officially began on October 2, 2018. This is the tenth monthly progress report. Please contact me at (760) 791-5884 if you have any questions or comments regarding this submittal.

Sincerely,

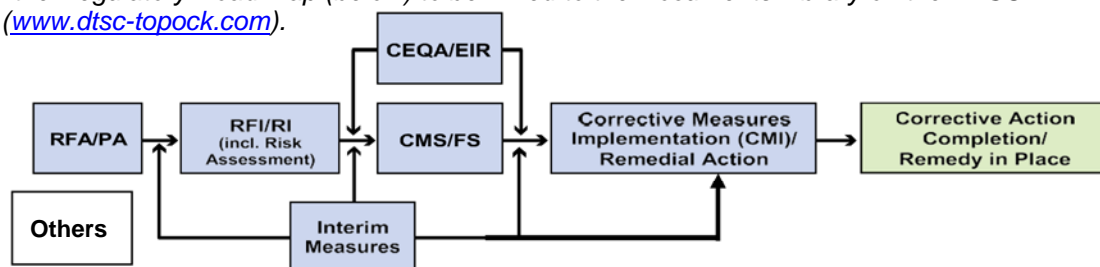
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Topock Project Executive Abstract

<p>Document Title: <i>July 2019 Monthly Progress Report for the Groundwater Remedy Construction and Startup, PG&E Topock Compressor Station, Needles, California</i></p> <p>Submitting Agency: DOI, DTSC</p> <p>Final Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Date of Document: 8/10/2019</p> <p>Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E</p>
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<p>Type of Document:</p> <p><input type="checkbox"/> Draft <input checked="" type="checkbox"/> Report <input type="checkbox"/> Letter <input type="checkbox"/> Memo</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What does this information pertain to?</p> <p><input type="checkbox"/> Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)</p> <p><input type="checkbox"/> RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)</p> <p><input type="checkbox"/> Corrective Measures Study (CMS)/Feasibility Study (FS)</p> <p><input checked="" type="checkbox"/> Corrective Measures Implementation (CMI)/ Remedial Action(RA)</p> <p><input type="checkbox"/> California Environmental Quality Act (CEQA)/ Environmental Impact Report (EIR)</p> <p><input type="checkbox"/> Interim Measures</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What is the consequence of NOT doing this item? What is the consequence of DOING this item?</p> <p>The consequence for not doing this item is PG&E will be out of compliance with the 1996 Corrective Action Consent Agreement (CACA) and the 2013 Remedial Design/ Remedial Action Consent Decree (CD), as well as the Construction/Remedial Action Work Plan (C/RAWP).</p>	<p>Other Justification/s:</p> <p><input type="checkbox"/> Permit <input type="checkbox"/> Other / Explain:</p>
<p>Brief Summary of attached document:</p> <p>This monthly report describes activities taken during July 2019 and activities planned for the next six weeks (August 4 through September 14, 2019) and presents available results from sampling and testing in July 2019. In addition, this report discusses material deviations from the approved design documents and/or the <i>Construction/ Remedial Action Work Plan (C/RAWP)</i>, if any, that PG&E has proposed to the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior (DOI) or that have been approved by DTSC and DOI. This report also highlights key personnel changes, if any, and summarizes activities performed and activities planned at the Topock Compressor Station in support of DOI's 2012 Community Involvement Plan and DTSC's 2019 Community Outreach Plan, as well as contacts with local community, representatives of the press, and/or public interest groups, if any.</p> <p>Written by: Pacific Gas and Electric Company</p>	
<p>Recommendations:</p> <p>Provide input to PG&E.</p>	
<p>How is this information related to the Final Remedy or Regulatory Requirements:</p> <p>This submittal is required in compliance with the CACA, CD, and pursuant to the C/RAWP.</p>	
<p>Other requirements of this information?</p> <p>None.</p>	

Related Reports and Documents:

Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com).



Legend

RFA/PA – RCRA Facility Assessment/Preliminary Assessment

RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)

CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study



July 2019
Monthly Progress Report for the
Final Groundwater Remedy Construction and Startup

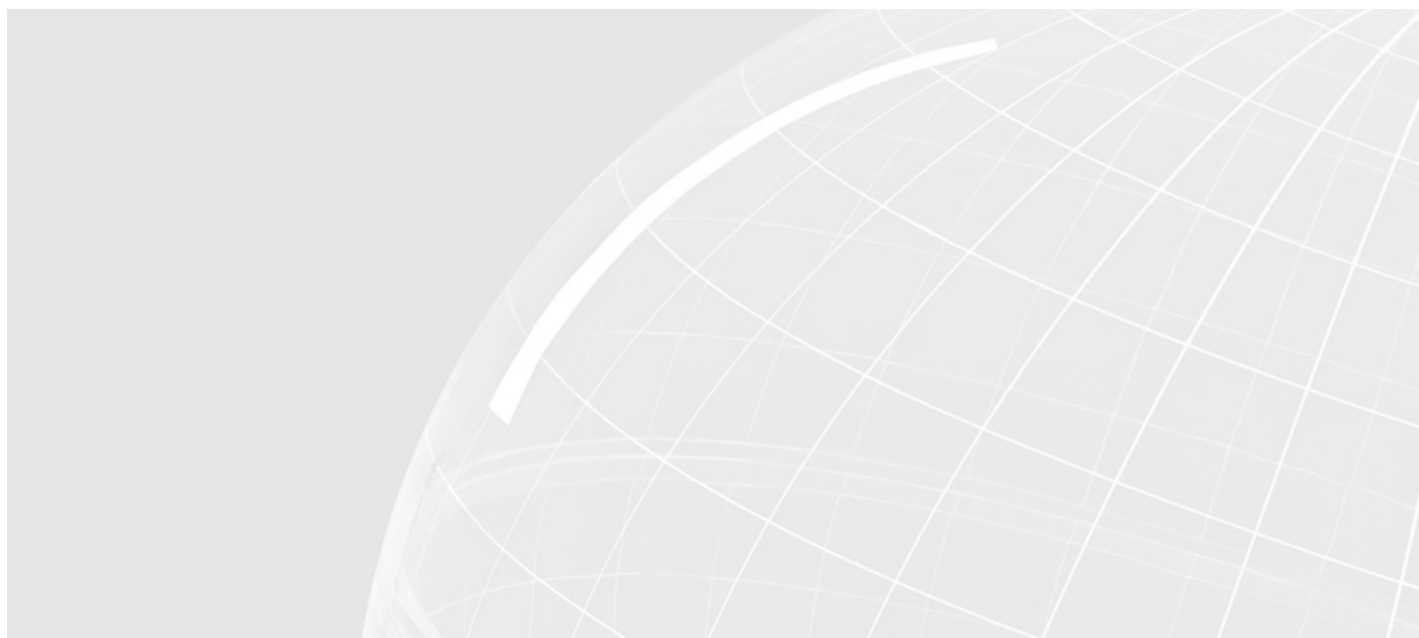
PG&E Topock Compressor Station
Needles, California

Document ID: TPK_Monthly_Progress_Rpt_June_20190810_Final

August 2019

Prepared for
U.S. Department of the Interior and California Department of Toxic Substances Control

On Behalf of
Pacific Gas and Electric Company



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Acronyms and Abbreviations

µg/m ³	micrograms per cubic meter
AOC	Area of Concern
APE	Area of Potential Effect
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BLM	U.S. Bureau of Land Management
BMP	best management practice
CACA	Corrective Action Consent Agreement
C/RAWP	Construction/Remedial Action Work Plan
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CHQ	Construction Headquarters
DOI	United States Department of the Interior
DTSC	California Department of Toxic Substances Control
ERTC	Environmental Release to Construct
FCR	field contact representative
LOC	level of concern
NTH	National Trails Highway
PBA	Programmatic Biological Agreement
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
SEIR	Subsequent Environmental Impact Report
SPY	Soil Processing Yard
SWPPP	Stormwater Pollution Prevention Plan
TCS	Topock Compressor Station
TRC	Technical Review Committee
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WEAT	Worker Environmental Awareness Training
WVR	Work Variance Request

1. Introduction

Pacific Gas and Electric Company (PG&E) is implementing the final groundwater remedy to address chromium in groundwater near the PG&E Topock Compressor Station (TCS), located in eastern San Bernardino County 15 miles southeast of the city of Needles, California.

The U.S. Department of the Interior (DOI) is the lead federal agency overseeing remedial actions at the TCS. PG&E and the United States executed a Remedial Design/Remedial Action Consent Decree (CD), on behalf of the DOI, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 2012, which was approved by the U.S. District Court for the Central District of California in November 2013 (DOI, 2013). Paragraph 32 and Appendix C (Section 5) of the CD requires PG&E to submit to DOI electronic progress reports during construction of the remedial action and on a quarterly basis after the selected remedy has been implemented and demonstrated to be operating as intended.

The California Department of Toxic Substances Control (DTSC) is the lead state agency overseeing corrective actions at the TCS. Remedial activities are being performed in conformance with the requirements of the Resource Conservation and Recovery Act (RCRA) Corrective Action pursuant to a Corrective Action Consent Agreement (CACA) entered into by PG&E and the DTSC in February 1996 (DTSC, 1996). Attachment 6, Part E, Section 9a and Attachment 7 of the CACA require PG&E to provide certain information in monthly progress reports during construction of the corrective action.

In compliance with the above CACA and CD requirements, PG&E proposed a template for the monthly progress reports in Exhibit 2.6-2 of the Construction/Remedial Action Work Plan (C/RAWP) (CH2M HILL, Inc. [CH2M], 2015b). The C/RAWP was approved by DOI on April 3, 2018 (DOI, 2018) and DTSC on April 24, 2018 (DTSC, 2018a).

This is the tenth of the monthly progress reports that will be submitted to DOI and DOI for the duration of the remedy construction and startup. This monthly progress report documents activities during July 2019, and follows the content and format described in Exhibit 2.6-2 of the approved C/RAWP. The report is organized as follows:

- **Section 2.1** describes completed construction activities; data collected, generated or received; nature and volume of waste generated; waste handling/disposal; issues encountered; actions taken to rectify problems/issues; personnel changes; and Work Variance Requests (WVRs; i.e., material deviations from the design documents, the C/RAWP, or other approved work plans), if any, as well as agencies' actions on those requests, and potential schedule impacts.
- **Section 2.2** summarizes contacts with representatives of the press, local community, or public interest groups during the reporting period, other activities provided to assist DTSC and/or DOI in support of the Community Outreach Plan (DTSC, 2019) and/or Community Involvement Plan (DOI, 2012), respectively, and anticipated near-term (approximately next six weeks) activities in support of the Community Outreach and Community Involvement Plans.
- **Section 2.3** describes the planned activities for the next six weeks (construction activities, sampling and monitoring events, etc.).
- **Section 2.4** provides information relating to the construction schedule progress, sequencing of activities, information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule, and a description of efforts made to mitigate those delays or anticipated delays, if any.
- **Section 3** lists the references cited in this report.

Please note that since activities conducted to comply with the project's Applicable or Relevant and Appropriate Requirement (ARARs) and the Subsequent Environmental Impact Report (SEIR; DTSC, 2018b) mitigation measures are currently reported in separate compliance reports, the same information is not repeated in the monthly reports.

2. Monthly Update

2.1 Description of Activities and Work Completed

2.1.1 Work Completed

Highlights of key activities related to the construction of the groundwater remedy completed during June 2019 include the following (in chronological order):

- On July 13, 2018, PG&E sent via email the first weekly six-week look-ahead schedule for the remedy construction field work. The weekly emails provide highlights of field activities in the previous week, field activities scheduled for the next week, and planned activities for the next six weeks. Recipients of the weekly emails are DOI, DTSC, the U.S. Fish and Wildlife Service (USFWS), Tribes, and the Technical Review Committee (TRC). PG&E continues to send these weekly emails to date. As of July 31, 2019, a total of 55 six-week look-ahead schedule emails have been sent. **Of those, four six-week look-ahead schedule emails were sent in July 2019 (on July 7, 14, 21, and 27, 2019).**
- On August 10, 2018, PG&E issued the first Environmental Release to Construct (ERTC) to contractors. As of July 31, 2019, a total of 47 ERTCs were issued for mobilization and construction activities (see Table 2-1). **Of those, one ERTC was issued in July 2019.**
- Starting on October 4, 2018, PG&E has published a daily construction activities list and discussed the list at the morning tailboards with Tribes and agency representatives. This daily list is intended to inform and facilitate observation by Tribes and agency representatives on site on that day. PG&E continues to publish these daily lists and discuss the list at the daily morning tailboards to date. **In July 2019, a total of 26 daily construction activities lists were published and discussed at the morning tailboards.**
- In July 2019, PG&E completed the following construction activities (see Figures 2-1 and 2-2 for locations of key areas and wells, as well as select photos in **Attachment A**):
 - **Non-Well Construction Activities:**
 - a) Substantially completed Pipeline C Segments C3, C4, C5 in the floodplain.
 - b) Substantially completed the aggregate base road north of the BNSF bridge.
 - c) Completed the Construction Headquarters (CHQ).
 - d) Prepared for the installation of remedy pipelines B and J (e.g., moved sand from the floodplain to staging areas along the pipeline alignment).
 - **Pilot Boring/Well Installation Activities (Rotosonic drilling):**
 - a) Complete pilot boring at RB-2, RB-3, and RB-4, and backfilled with sand.
 - b) Completed development at MW-B, MW-O, and MW-R.
 - c) Completed well head installation at MW-O, MW-10D, and MW-R.
 - **Remedy Well Installation Activities (Dual Rotary drilling):**
 - a) Completed remedy well installation at RB-5.
 - b) Completed specific capacity test at IRZ-20.
 - c) Conducted well development at IRZ-21 and IRZ-23.
 - d) See **Attachment B** for available information such as boring logs, water analytical results, and well testing activities. In addition, PG&E has summarized and presented PG&E's observation of the aquifer data collected to date at the April 3, 2019 Consultative Work Group (CWG) meeting and the August 7, 2019 Technical Work Group (TWG) meeting.
 - **Baseline/Opportunistic Soil Sampling Activities:**

- Pursuant to the Baseline Soil Sampling and Analysis Plan (Appendix A of the Soil Management Plan [which is Appendix L of the C/RAWP]), one soil sample was collected at approximately 1 foot below ground surface (bgs) at IRZ-19 (sampled on July 24, 2019).
- See **Attachment C** for information about soil sampling locations and soil analytical results that are available at this time. There are no new soil data in July 2019.
- **Perimeter Air Sampling Activities:**
 - a) Dust monitoring/observation was conducted through July 31, 2019 at the perimeter of select work areas.
 - b) Perimeter air sampling for hexavalent chromium is performed at the perimeter of the work areas (outside of the exclusion zone) that are inside or within 20 feet of Areas of Concern (AOCs) and within the construction footprint where hexavalent chromium concentrations in soil have been historically reported. No air sampling event occurred in July 2019.
 - c) See **Attachment D** for information about previous air sampling locations and air analytical results.
- **Noise Monitoring Activities:**
 - a) Noise monitoring is conducted at pre-approved locations closest to the construction activities. Through July 31, 2019, noise monitoring was conducted at the following pre-approved locations:
 - Location west of the mobile home park at Moabi Regional Park,
 - Location Maze B Combined Area 1/2,
 - Location Maze C Area 1, and
 - Location mobile home park at Topock Marina.
 - b) See **Attachment E** for information about pre-approved noise monitoring locations and a summary of noise monitoring data available to date.

2.1.2 Work Already Underway and During Implementation

As of July 31, 2019, PG&E has started and will continue to perform the following activities:

- Continue to drill and install well at MW-C, MW-X, and MW-H.
- Continue to install remedy well at RB-4 (dual rotary rig).
- Plan for the abandonment of well MW-B-167 and drilling of a replacement well.
- Start the installation of Pipeline B.
- Repair a portion of the access matting under the BNSF bridge.
- Continue to plan for the installation of Pipeline C6 on the MW-20 Bench.
- Continue to install temporary service water and wastewater pipelines for dual rotary drilling at RB well locations.
- Continue to conduct noise and dust monitoring and inspection of Stormwater Pollution Prevention Plan (SWPPP) Best Management Practices (BMPs).
- Continue to track and manage waste generated.
- Continue to manage displaced soil per the approved Soil Management Plan (Appendix L of the C/RAWP).

2.1.3 Freshwater Usage, Waste Generation and Management

As of July 31, 2019, the volumes of freshwater used for remedy construction and waste streams generated from remedy construction (starting on October 2, 2018) are as follows:

Freshwater Usage and Wastewater Management

- An approximate total of 2,804,050 gallons (8.6 acre-feet) of freshwater was used, of which an approximate 9.2 percent was for pilot boring/well installation and general construction, 1.1 percent for hydrostatic testing of pipeline, and 89.7 percent was for fugitive dust suppression. Of this amount, 568,500 gallons of freshwater was used in July 2019.
- An approximate total of 45,600 gallons of hydrostatic testing water was discharged to land. Of this amount, 44,500 gallons were discharged in May 2019 and 1,100 gallons were discharged in June 2019. No discharge to land occurred in July 2019. All discharges to land comply with the substantive requirements of State Water Resources Control Board (SWRCB) Water Quality Order 2003-0003-DWQ. See **Attachment F** for approximate volume at each approved discharge location and date of each discharge.
- An approximate total of 174,227 gallons of wastewater generated from drilling operations were discharged to Compressor Station evaporation pond #4. In July 2019, 49,281 gallons of wastewater was discharged to pond #4. The discharge complies with the Waste Discharge Requirements (WDRs) of the California Regional Water Quality Control Board (CRWQCB), Colorado River Basin Region, Order No. R7-2018-0022.

At each sonic drilling location, the wastewater is initially stored in a holding tank in the primary work zone, and is transferred from the primary work zone, as needed, to 20,000-gallon frac tanks located at the MW-20 Bench. Each transfer load is tracked. At each dual rotary drilling location, freshwater and wastewater are conveyed between the frac tanks and the drilling location via pipes. Once a frac tank is full, its contents is characterized and managed in accordance with the approved Waste Management Plan (Appendix R of the C/RAWP).

Displaced Materials/Soils/Clay

- Approximately 313.3 cubic yards of drill cuttings were generated from well drilling and geotechnical investigation. Of those, approximately 1.3 cubic yards are clay from Pipeline F geotechnical investigation (using hollow stem auger). Drill cuttings are typically stored in roll-off bins with closed tops. Samples are collected from the bins for characterization and analyzed in accordance with the Soil Management Plan.
 - The clay collected from the Pipeline F geotechnical investigation is stockpiled at the SPY, separate from the other clean soil, in accordance with the revised clay handling protocol in Addendum to the Soil Management Plan (dated May 28, 2019).
- During sonic drilling of MW-O, fat clay with sand (CH) was encountered at 26.8 to 27.8 feet below ground. The clay material retrieved from drill cores was put in a zip lock bag and characterized in accordance with the Soil Management Plan. The clay material was provided to the Tribes at their request on August 7, 2019.
- Approximately 40 cubic yards of displaced soil was generated from the potholing activities along remedy pipeline alignments to pre-characterize soil in preparation for pipeline installation. Samples were collected for characterization in accordance with the Soil Management Plan. These soils are currently stored in bins at the SPY. A decision on the final disposition of these soils is forthcoming.
- Approximately 100 cubic yards of displaced soil was generated from excavation for the brine tanks containment upgrade at the MW-20 Bench. Samples were collected for characterization and analyzed in accordance with the Soil Management Plan. This soil is currently stockpiled on a plastic liner at the SPY. A decision on the final disposition of this soil is forthcoming.

General Construction Waste, Sanitary Waste, and Recyclables

- In July 2019, approximately 90 cubic yards of general construction waste and 5.7 tons of green waste/construction debris (e.g., concrete from wash outs) were generated and transported to Republic Services in Lake Havasu City for disposal and management.
- Sanitary waste from construction trailers/portable toilets is hauled offsite as needed.

2.1.4 Worker Training and Education

- PG&E continues to provide the mandatory Site Health and Safety Training for its employees and contractors on a daily basis. As of July 31, 2019, a total of 97 health and safety training sessions were held and 337 employees and contractors received the training. **Of those, in July 2019, eleven sessions were conducted and 20 employees/contractors were trained.** After the training, the attendees signed the training roster.
- PG&E continues to provide the mandatory Worker Environmental Awareness Training (WEAT) to its employees and contractors that will be involved in the remedy construction project. The training is offered regularly on Mondays and Thursdays, and more frequently as needed. As of July 31, 2019, a total of 99 WEAT sessions were conducted and 382 employees and contractors received the training. **Of those, in July 2019, 8 sessions were conducted (on 7/9, 7/11, 7/15 (twice), 7/18, 7/23, 7/25, 7/31) and 19 employees/contractors were trained.** Educational brochures are made available to attendees of the training; they are designed to reinforce the key topics and highlight the take-aways discussed during the classroom training. After the training, the attendees signed the WEAT completion form.
- PG&E's onsite biologist also trained Field Contact Representatives (FCRs), who will be responsible for compliance with biological avoidance and mitigation measures. As of July 31, 2019, a total of 10 FCR training sessions were conducted and 54 employees and contractors received the training. **No FCR training was conducted in July 2019.**
- Training records are kept electronically and at the temporary construction trailers at the SPY. The records are available upon request.

2.1.5 Status of Work Variance Requests (WVRs)

PG&E did not propose any new work variance in July 2019. See Table 2-2 for information regarding activities related to previously proposed WVRs (i.e., material deviations from the design documents, the C/RAWP, or other approved work plans), and agencies' actions on those requests.

2.1.6 Use of Future Activity Allowance

There was no proposed use of Future Activity Allowance (FAA) to date.

2.1.7 Issues Encountered and Actions Taken to Rectify Issues/Problems

- On May 31, 2019, PG&E conducted a video log of the well casings in the deep well cluster at MW-B (MW-B-267 and MW-B-337). Results for the video log indicate that solid materials were encountered in both casings, with approximately 70 to 78 feet of materials. There were no direct observations of a crack in either of the casings. On June 25-26, 2019, PG&E developed the deep well MW-B-337 and bailed out the solids; the development was successful (reduce turbidity to approximately 10 NTU) and the solid materials appear to be silt and fine sand. A video log was performed of the cleaned out well; there was no evidence of damage to the screen or casing. PG&E will discuss and propose options for abandonment of the shallower and damaged well MW-B-267, with the agencies. In addition, PG&E will also discuss replacement of MW-B-267 with the agencies.
- A portion of a tremie pipe was lost in the casing during installation of MW-R. The crew tried to thread back on to the piece but were unsuccessful. It is believed that there was damage to the threads of that piece, which is why it was lost and could not be retrieved. The crew have been directed to inspect the joints of each section of tremie pipe when they are installing it to prevent this from happening again. MW-R will be developed and sampled using narrow (1-inch) tool.

- PG&E continues to work with Transwestern to resolve the conflict between their gas pipeline and the portion of Pipeline F, just outside of the Transwestern Bench.
- PG&E continues to work with Frontier to resolve the conflict between their telecom line and Pipeline C segments C13, C15, and C16, in the shoulder of NTH.
- PG&E continues to work with Kinder Morgan to resolve the conflict between their gas pipeline and Pipeline C segment C17, north of the Transwestern Bench.
- PG&E is working with potential subcontractors on the details of an installation plan for the jack-and-bore under NTH.
- Cascade indicated that the space available for the dual rotary rig to install remedy well IRZ-27 (along NTH) is not adequate. PG&E is evaluating different rig set up configurations to minimize the work space while allowing Cascade to safely drill at this location.
- PG&E is evaluating the location of IRZ-19 in proximity to the current alignment of Pipeline C, Segment C6 (transition from the floodplain to the MW-20 Bench), to minimize the work area for the dual rotary rig at this location.

2.1.8 Key Personnel Changes

There was no change to key PG&E project personnel in July 2019.

2.2 Communication with the Public

PG&E did not have any key communications with the public in July 2019:

2.3 Planned Activities for Next Six Weeks

The planned activities for next six weeks (August 4 through September 14, 2019) include the following:

- Well installation activities:
 - Complete installation of wells MW-C, MW-D, MW-H, MW-X, RB-3, and RB-4.
 - Complete drilling of pilot boring at IRZ-19.
 - Start drilling well RB-2, MW-Y', and MW-S.
 - Conduct well testing at IRZ-23 and IRZ-21.
 - Continue well testing at IRZ-20.
 - Complete well development at MW-B, MW-C, and RB-5.
 - Drilling of pilot boring at IRZ-37 did not occur as previously forecasted due to the availability of spider rig. This activity will be added to a six-week look ahead schedule when rig availability is known.
- Non-well construction activities:
 - Continue to install Pipeline B and J.
 - Start installation of Pipeline C Segment C6.
 - Continue to conduct noise and dust monitoring and inspection of SWPPP BMPs.
 - Continue to log and manage waste generated.
 - Continue to manage displaced soil per the approved Soil Management Plan.

Attachment G contains the six-week look-ahead schedule available at this time. Any adjustments to the schedule will occur as needed via the weekly emails (sent at the end of each week) and/or the daily list of

construction activities (published daily and discussed with agency and Tribal representatives on site on that day).

2.4 Construction Schedule Review

Phase 1 of the groundwater remedy construction started on October 2, 2018. Table 2-3 presents a summary of the percent completeness for key construction activities as of July 31, 2019. An update to Phase 1 construction schedule will be presented in the next monthly progress report.

2.5 Available Sitewide Groundwater Monitoring Data (DTSC Condition of Approval xi)

Pursuant to Condition of Approval # xi in DTSC's approval letter dated August 24, 2018 (DTSC, 2018a), PG&E is required to report data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection. In compliance with this requirement, PG&E submitted validated data to DTSC via monthly emails. For ease of recordkeeping and to minimize the number of ad-hoc compliance reports/emails, PG&E has included validated data in each monthly progress report starting with the November 2018 report (see **Attachment H**).

3. References

California Department of Toxic Substances Control (DTSC). 1996. *Corrective Action Consent Agreement (Revised), Pacific Gas and Electric Company's Topock Compressor Station, Needles, California*. EPA ID No. CAT080011729. February 2.

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Tables

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station, Needles, California

ERTC No.	Brief Description of Covered Areas and Scope of Authorized Activities	Issue Date
Non-Well ERTCs		
1	Initial mobilization activities at the Construction Headquarters (CHQ), Soil Processing Yard (SPY), and three staging areas (#9 Parking area off I-40, #18 MW-20 Bench, and #23 Transwestern Bench). Scope included installation of temporary construction trailers, portable generators, SWPPP BMPs, construction signages, and temporary construction fencing, as well as equipment staging and truck inspections.	August 10, 2018
Addendum 1 to ERTC #1	Scope included setup of wastewater and freshwater storage tanks at MW-20 Bench, improvement of the access road at the CHQ, installation of perimeter fence at the SPY, and grading at SPY.	September 21, 2018
Addendum 2 to ERTC #1	Scope included grading for drill rig setup at IRZ-20.	October 4, 2018
Addendum 3 to ERTC #1	Scope included geotechnical investigation in the footprint of the future Carbon Amendment building at the MW-20 Bench.	October 9, 2018
Addendum 4 to ERTC #1	Scope included the installation of a temporary handrail along the walkway from the MW-20 Bench to the floodplain.	December 28, 2018
2	Scope included the installation of the temporary construction water system and construction water tanks at Area #25 Route 66 Welcome Sign.	September 28, 2018
3	Scope included the installation of the Public Information Trailer, a fugitive dust sign, an information kiosk, and a construction delivery sign at the northwest corner of Park Moabi Road and National Trails Highway (NTH).	September 4, 2018
4	Scope included the installation of a truck containment pad at the TCS evaporation ponds and maintenance of the access road to the ponds.	September 24, 2018
6	Scope included the geotechnical investigation along Pipeline F alignment (on the Compressor Station entrance road).	October 3, 2018
7	Scope included the installation of traffic control along the southern end of NTH per the Traffic Control Plan.	September 17, 2018
9	Scope included the transplantation and planting of sensitive plants.	November 9, 2018
10	Scope included potholing activities along approved pipeline alignments and in building footprints, that are also in AOCs/SMWUs. The purpose is to pre-characterize soil in preparation for construction.	March 29, 2019
11	Scope included preparation of temporary staging areas, vegetation clearance, placement of stabilization mats, potholing in select locations, and installation of Pipeline C segments C1 through C6 in the floodplain.	January 3, 2019
11a	Scope included preparation of temporary staging areas, vegetation clearance, placement of stabilization mats, potholing in select locations, and installation of Pipeline C segments C7-C10, and C17 in the floodplain.	February 11, 2019
11b	Scope included installation of Pipelines B, F, and J.	May 31, 2019
12	Scope included non-intrusive site preparation work for the brine tanks containment upgrade on the MW-20 Bench (per Work Variance Request #1, see Table 2-2). A forthcoming addendum to this ERTC will be issued to include the actual upgrade activities.	January 10, 2019
12a	Scope included the actual brine tanks containment upgrade activities which include intrusive work on the MW-20 Bench (per Work Variance Request #1, see Table 2-2).	February 6, 2019
Well ERTCs		
5a	Scope included the site setup, drilling, testing, and demobilization at MW-L.	September 27, 2018
5b	Scope included the placement of soil stabilization mats in the floodplain, setup of a temporary staging area near the north end of the access route in the floodplain, rig setup, installation of snow fence to protect plants, drilling, testing, and demobilization at IRZ-15.	October 12, 2018
5c	Scope included the site setup, drilling, testing, and demobilization at IRZ-20 on the MW-20 Bench.	October 15, 2018

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California

ERTC No.	Brief Description of Covered Areas and Scope of Authorized Activities	Issue Date
5d	Scope included the site setup, drilling, testing, and demobilization at MW-E on the MW-20 Bench.	October 29, 2018
5e	Scope included the site setup, drilling, testing, and demobilization at MW-N in the upland.	November 15, 2018
5f	Scope included the site setup, drilling, testing, and demobilization at IRZ-13 in the floodplain.	November 7, 2018
5g	Scope included the site setup, drilling, testing, and demobilization at IRZ-23 on the MW-20 Bench.	November 8, 2018
5h	Scope included the site setup, drilling, testing, and demobilization at MW-M in the upland.	January 15, 2019
5i	Scope included the site setup, drilling, testing, and demobilization at IRZ-9 in the floodplain.	November 28, 2018
5j	Scope included the site setup, drilling, testing, and demobilization at IRZ-25 on the MW-20 Bench.	December 3, 2018
5k	Scope included the site setup, drilling, testing, and demobilization at IRZ-21 on the MW-20 Bench.	December 9, 2018
5l	Scope included the site setup, drilling, testing, and demobilization at MW-B in the floodplain.	December 10, 2018
Addendum to ERTC #5l	Scope included the setup of an additional temporary equipment and material staging area in the floodplain.	December 13, 2018
5m	Scope included the site setup, drilling, testing, and demobilization at MW-F along NTH.	December 17, 2018
5n	Scope included the site setup, drilling, testing, and demobilization at IRZ-11 in the floodplain.	December 17, 2018
5o	Scope included the site setup, drilling, testing, and demobilization at MW-X and MW-Y' in Arizona.	April 23, 2019
5p	Scope included the site setup, drilling, testing, and demobilization at MW-G along NTH.	January 14, 2019
5q	Scope included the site setup, drilling, testing, and demobilization at IRZ-16 and IRZ-17 in the floodplain.	February 14, 2019
5r	Scope included the site setup, drilling, testing, and demobilization at IRZ-27 and IRZ-29 along NTH. Also included in the scope are potholing activities along Pipeline C Segments C13, C15, and C16 and on the MW-20 Bench.	March 9, 2019
Addendum #1 to ERTC #5r	Scope included the potholing to locate Transwestern Gas Pipeline within NTH (in support of Pipeline C installation).	April 24, 2019
5s	Scope included the site setup, drilling, testing, and demobilization at IRZ-39 in the low area, north of the Transwestern Bench.	March 12, 2019
5t	Scope included the site setup, drilling, testing, and demobilization at IRZ-27 along NTH.	March 19, 2019
5u	Scope included the site setup, drilling, testing, and demobilization at MW-U in I-40 median.	March 22, 2019
5v	Scope included the site setup, drilling, testing, and demobilization at MW-10D in Bat Cave Wash.	March 27, 2019
5w	Scope included the site setup, drilling, testing, and demobilization at MW-W in the floodplain.	March 22, 2019
5x	Scope included the site setup, drilling, testing, and demobilization at RB-1 through 5 wells and MW-O in the floodplain.	March 30, 2019
5y	Scope included the site setup, drilling, testing, and demobilization at MW-S on the access road to Bat Cave Wash.	April 12, 2019
5z	Scope included the site setup, drilling, testing, and demobilization at MW-R in the Upland.	May 8, 2019
5aa	Scope included the site setup, drilling, testing, and demobilization at MW-C, MW-D, and MW-H in the floodplain	June 6, 2019
5ab	Scope included the site setup, drilling, testing, and demobilization at IRZ-19 (sonic drilling) in the floodplain	July 22, 2019

Table 2-2 Summary of Work Variance Requests (WVRs)

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California

WVR No.	Brief Description of Work Variance Request	Approval Dates
1	<p>This WVR addressed PG&E's proposed modification to the brine tanks containment for use by the remedy, specifically:</p> <ul style="list-style-type: none"> • Upgrade the existing lined containment to concrete - The original synthetic liner material has degraded from exposure to UV light, heat, and abrasion and must be replaced. PG&E proposed to replace the synthetic-lined containment (including K-rails) with a concrete containment to support the groundwater remedy. The concrete color will be desert tan, and information on this proposed concrete color will be submitted to the agencies for review. The proposed concrete material will be similar to the material of the truck lane in the final remedy design (see Appendix E of the Final Basis of Design Report (CH2M, 2015a),* Section 033 00, Cast-In-Place Concrete). • Shorten the length of the containment - This containment will have the same height as the existing containment, but with a slightly smaller footprint (the length is 5 feet shorter). This smaller footprint still meets the required volume for a secondary containment and allows for more space for remedy construction at the tight MW-20 bench. 	<p>DOI approved WVR #1 on June 22, 2018</p> <p>DTSC approved WVR #1 on July 5, 2018</p>
2	<p>PG&E proposed to relocate the tie-in point for remedy construction water to an aboveground location inside TCS and below the TCS Water Storage Tanks. This is to eliminate the risk of damaging the existing pressurized 6-inch water line and to avoid any interference with PG&E Gas Operations control of the Station's water supply. The WVR addressed this relocation, specifically:</p> <ul style="list-style-type: none"> • Relocate the construction water tie-in point to an aboveground location below the TCS Water Storage Tanks, inside TCS – The final design calls for the temporary construction water line to hot-tap into the existing 6-inch steel water line just as the line turns southwest to continue to TCS. PG&E proposed to move the tie-in point to an aboveground valve manifold, located below the TCS Water Storage Tanks in the boneyard area. • Extend the temporary construction water line to the new tie-in point, along Pipeline 300A access road – The planned 4-inch high-density polyethylene (HDPE) temporary construction water line will be extended, following the route of the Pipeline 300A access road, to the new tie-in point inside TCS. This pipeline extension is approximately 1,950 feet and is also made of 4-inch HDPE. The pipe will be laid on ground surface and to the south of the 6-inch water line where possible. At the crossing with the SoCal Gas pipeline access road, the pipeline will be at grade with fill to allow for vehicle crossing. 	<p>DOI/DTSC approved WVR #2 on August 29, 2018</p>
3	<p>PG&E proposed changes within the CHQ fence line to avoid/minimize the overall amount of soil disturbance during construction, reduce the number of truck trips to haul wastewater, and allow for additional working space within the yard. There are no proposed changes to the CHQ footprint nor its fence line. The specifics are described below:</p> <ul style="list-style-type: none"> • Relocate the decontamination pad from the western fence to the northern fence (near the western corner). Based on recent survey data collected during construction, the difference in ground elevation between northern and southern end of the pad is about 4 feet. Moving the pad to the northern fence would eliminate the difference in ground elevation and reduce the amount of soil disturbance by at least 80 cubic yards. • Bring the remedy-produced wastewater tank from belowground to aboveground, increase the tank volume from 1,000 to 2,500 gallons, and place the aboveground, double-walled tank adjacent to the decontamination pad. The change from belowground to aboveground reduces the amount of soil disturbance by at least 50 cubic yards. The change to a bigger tank will reduce the amount of truck trips needed to haul wastewater. The placement of the tank adjacent to the decontamination pad allows for the pad to function as a secondary containment for the haul truck during off-loading of the wastewater. • Defer construction of the underground sewage tanks. Deferral of the underground tanks reduces the overall amount of soil disturbance by at least 800 cubic yards. All sanitary wastes will be managed in aboveground sewage tanks (similar to the ones currently used for the SPY trailers) or portable toilets. • Swap the location of the construction trailers and the sunshade and change the configuration of the sunshade from a rectangle to a square. This change will allow for more working space within the CHQ. All functions that would occur in the Workshop/Sampling Processing building will be conducted in the construction trailers. 	<p>DOI/DTSC approved WVR #3 on January 4, 2019</p>
4	<p>PG&E proposed to revise a segment of Pipeline C near the I-40 bridge, to meet the permit requirement in Caltrans Encroachment Permit No. 08-18-6-MW-0533. The revision involves</p>	<p>DOI/DTSC approved</p>

Table 2-2 Summary of Work Variance Requests (WVRs)

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California

WVR No.	Brief Description of Work Variance Request	Approval Dates
	relocating a small segment of Pipeline C to within National Trails Highway to meet a minimum distance of 10 feet from current and future I-40 bridge footings. The treatment measure specified for Segment X of National Trails Highway in the Cultural and Historic Property Management Plan will be implemented during installation of this pipeline segment.	WVR #4 on May 14, 2019
5	PG&E proposed to phase the remedy produced water conditioning system within the approved footprint inside TCS.	DOI and DTSC approved WVR #5 on July 19 and July 22, 2019, respectively.
6	<p>In early October 2018, PG&E conducted a geotechnical investigation along the Pipeline F alignment on the entrance road to the Topock Compressor Station (TCS) and the adjacent hill side. Based on the geotechnical results, the construction contractor (PIVOX) indicated that soldier piles and lagging would be required for temporary shoring. Over 40 soldier piles would be installed by drilling using a 330-sized excavator or larger. A 330-sized excavator has a general width of 11 feet, and counter weight clearance of approximately 4 feet. During operation, this rig would occupy a minimum 15 to 16 feet width of the TCS entrance road for about 12 days. The paved width of the road is between 22 to 24 feet in the area of shoring (per review of the location via Google Earth).</p> <p>Assuming a minimum clearance of 1 foot (which is still less than the recommended clearance) from any operating equipment, there will be approximately 5 to 8 feet of available lane width for access by TCS traffic. Large vehicles (tractor-trailers, delivery trucks, construction equipment) will likely not be able to pass by the active operation, and passenger vehicles may also not be able to pass the active operation in locations where the road narrows. Also, the excavator cannot be repositioned while soldier piles are being drilled. In sum, access to TCS will be severely restricted for about 12 days. This is not acceptable for Compressor Station operations.</p> <p>Therefore, PG&E proposed to realign Pipeline F (starting from segment F3) along the approved alignment of Pipelines B and J. Construction of Pipelines F, B, and J would occur in the same alignment and at the same time.</p>	DOI and DTSC approved WVR #6 on May 21 and May 22, 2019, respectively.

Note:

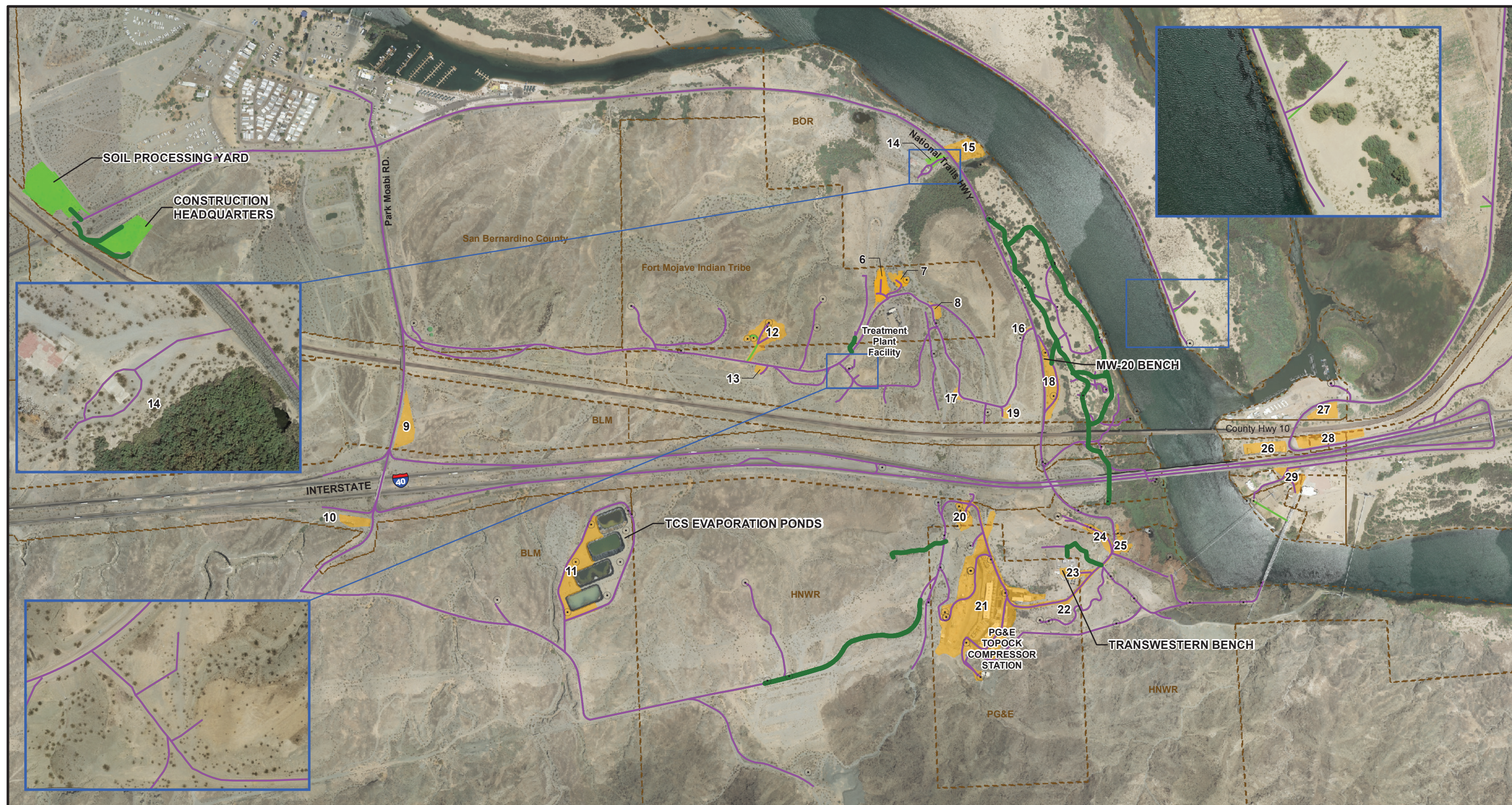
* CH2M HILL, Inc. (CH2M). 2015a. *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

Table 2-3 Summary of Percent Completeness of Key Construction Activities

*July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California*

Activity	% Complete	Current Status of Construction Activities (as of July 31, 2019)
Project signage & Public Information Office	100%	Complete.
Staging Area 9 setup	100%	Complete.
Staging Area 23 setup	100%	Complete.
Staging Area 18 setup	100%	Complete.
Temporary construction offices at Soil Processing Yard	100%	Complete.
Soil Processing Yard setup for construction staging	100%	Complete.
National Trails Highway lane closure and traffic control installation	100%	Complete.
Temporary construction water line	100%	Complete.
TCS Ponds concrete containment pad	100%	Complete.
Construction Headquarters (CHQ) access road	100%	Complete.
Aggregate-based access road in floodplain	Not Available	Portion north of BNSF bridge is substantially complete.
CHQ security fence	100%	Complete
MW-L, N, E, W, O, R, 10D	100%	Complete.
MW-M, MW-F, MW-G	Not Available	Well construction complete. Surface completion will be scheduled when rig is available.
MW-B-33, MW-B-117, and MW-B-337	Not Available	Well construction complete.
MW-B-267	Not Available	Preparing for well abandonment and replacement are
MW-C, MW-H, MW-X	Not Available	Underway
RB-5, RB-4, RB-3, RB-2, IRZ-9, 13, 15, 16, 17, 21, 23, 25, 27, and 39 pilot borings	100%	Complete.
IRZ-20 remedy well	Not Available	Well construction and development complete. Specific capacity testing conducted in July. Additional testing in September.
IRZ-21 and IRZ-23 remedy wells	Not Available	Well construction complete. Well testing in August/September.
Pipeline C Segments C3, C4, C5	Not Available	Substantially complete. Testing of electrical conduits in September.
Brine Tanks containment upgrade	100%	Complete.
Pipeline B and J	Not Available	Start on August 12, 2019.

Figures

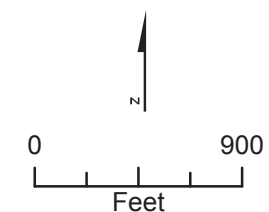


LEGEND

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Soil Processing (Area #5) and Construction Headquarter (Area #4) for Remediation Project
- Staging Areas for Remediation Project

Notes:

1. Decontamination pads will be located in Area #4 (Construction Headquarters), Area #21 (Topock Compressor Station), and Area #23 (Transwestern Bench).
2. Areas #15, 16, 17, 19, and 20 will not be used as staging areas. Areas #16, 17, and 19 may be part of the primary work zones for remedy infrastructure along the access road.
3. Area #20 may be part of the primary work zone for installation of future provisional well IRL-6 (if determined to be needed in the future) and associated piping/concrete/vault.
4. Public roadways outside of the EIR project area and the APE can also be used for remedy implementation.



**FIGURE 2.1-1
CONSTRUCTION SITE PLAN
AND ACCESS ROUTES**
GROUNDWATER REMEDY CONSTRUCTION/
PHASE 1
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA



LEGEND

Property Boundaries

Existing Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Water Supply Well

Planned Wells:

- Extraction, National Trails Highway (NTH) In-situ Reactive Zone (IRZ)
- Extraction, Riverbank
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Recirculation Well

Pipeline Corridor for Remedy

- Aboveground Pipe
- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure

Note:

- Note that in compliance with EIR mitigation measure CUL-1a-9, as well as PA and CHPMP mitigation measures, the pipeline along the dirt road west of National Trails Hwy is located in an existing, previously disturbed, access road. In addition, the location of the road and pipeline was field verified and does not create any direct physical impact or effect on the Topock Maze, as it is manifested archaeologically, in compliance with EIR mitigation measure CUL-1a-10, PA, and CHPMP mitigation measures.
- All well and structure locations are approximate.

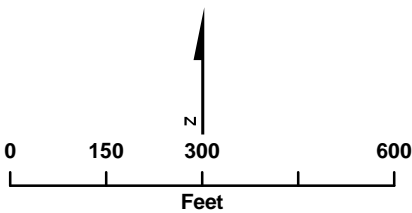


FIGURE 2-2
WELL AND PIPELINE LOCATIONS
GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Attachment A

Photographs



Placement of red slurry warning layer over electrical trench along Pipeline C Segment C3



Wash out of slurry mix into the secondary containments in the floodplain



**Applying water at
MW-20 bench for
dust control**



**Well development
at MW-R**



Setting and leveling
of 12kV pull box at
Pipeline C3, C4, A
intersection



MW-X and cores (in
the foreground)



**Street sweeping on
National Trails
Highway**



**Stockpile of 12"
HDPE at Pipeline B
& J work area**

Attachment B
Available Boring Logs, Well Construction
Logs, Well Testing, and Groundwater
Sample Results from Well Drilling

Table B-1. Groundwater Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
 PG&E Topock Compressor Station, Needles, California

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-10D	MW-10D-041119	04/11/19	108 - 123	160	160
MW-10D	MW-10D-VAS-107-112	04/01/19	107 - 112	95	96
MW-10D	MW-10D-VAS-118-123	04/02/19	118 - 123	200	190
MW-B	MW-B-VAS-27-32	01/06/19	27 - 32	5.9 J	7.7J
MW-B	MW-B-VAS-47-52	01/09/19	47 - 52	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-67-72	01/09/19	67 - 72	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-102-107	01/10/19	102 - 107	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-142-147	01/15/19	142 - 147	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-182-187	02/13/19	182 - 187	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-207-212	02/14/19	207 - 212	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-247-252	02/17/19	247 - 252	11 J	< 0.83 U
MW-B	MW-B-VAS-264-269	02/18/19	264 - 269	< 0.13 U	< 0.33 U
MW-B	MW-B-VAS-287-292	02/20/19	287 - 292	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-317-322	02/21/19	317 - 322	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-339-344	02/27/19	339 - 344	< 0.13 U	< 0.33 U
MW-B	MW-B-VAS-352-357	02/28/19	352 - 357	0.603 J	< 0.33 U
MW-B	MW-B-117-033019	03/30/19	WD, 117	< 0.13 U	< 0.17 U
MW-B	MW-B-33-033119	03/31/19	WD, 33	3.7	2.3
MW-B	MW-B-337-062619-INTERIM	6/26/19	WD	0.255 J	< 0.17 U
MW-C	MW-C-VAS-26-31	6/19/19	26-31	360	380
MW-C	MW-C-VAS-51-56	6/25/19	51-56	0.13 U	0.146 J
MW-C	DUP-01-062519	6/25/19	51-56	< 0.13 U	0.0931 J
MW-C	MW-C-VAS-66-71	6/26/19	66-71	< 0.13 U	< 0.033 U
MW-C	MW-C-VAS-81-86	6/27/19	81-86	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-117-122	6/28/19	117-122	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-147-152	6/29/19	147-152	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-165-170	6/30/19	165-170	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-176-181	7/1/19	176-181	380	410
MW-C	MW-C-VAS-186-191	7/1/19	186-191	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-200-205	7/2/19	200-205	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-216-221	7/3/19	216-221	0.448 J	< 0.17 U
MW-E	MW-E-VAS-52-57	11/05/18	52 - 57	7800	7000
MW-E	MW-E-VAS-82-87	11/06/18	82 - 87	190	200
MW-E	MW-E-VAS-112-117	11/06/18	112 - 117	3000	3100
MW-E	MW-E-VAS-137-142	11/07/18	137 - 142	7900	7300
MW-E	MW-E-70-121418	12/14/18	WD, 70	-	3000

Table B-1. Groundwater Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
 PG&E Topock Compressor Station, Needles, California

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-E	MW-E-142-121418	12/14/18	WD, 142	4500	4200
MW-F	MW-F-VAS-52-57	01/06/19	52 - 57	2700	2500
MW-F	MW-F-VAS-82-87	01/07/19	82 - 87	120	110
MW-F	MW-F-VAS-97-102	01/07/19	97 - 102	1900	1800
MW-F	MW-F-VAS-112-117	01/08/19	112 - 117	790	740
MW-F	MW-F-104-022719	02/27/19	WD, 104	1800	1700
MW-F	MW-F-60-022819	02/28/19	WD, 60	2300	2200
MW-G	MW-G-VAS-52-57	02/13/19	52 - 57	790	680
MW-G	MW-G-VAS-67-72	02/14/19	67 - 72	1000	920
MW-G	MW-G-VAS-77-82	02/15/19	77 - 82	710	600
MW-G	MW-G-82-030219	03/02/19	WD, 82	1500	1500
MW-G	MW-G-57-030219	03/02/19	WD, 57	510	560
MW-L	MW-L-VAS-76-81	10/06/18	76 - 81	34	31
MW-L	MW-L-VAS-106-111	10/09/18	106 - 111	0.697 J	0.84
MW-L	MW-L-VAS-141-146	10/10/18	141 - 146	< 0.13 U	< 0.033 U
MW-L	MW-L-VAS-181-186	10/20/18	181 - 186	3.8	3.3
MW-L	MW-L-VAS-218-223	10/21/18	218 - 223	68	66
MW-L	MW-L-VAS-261-266	10/22/18	261 - 266	0.284 J	< 0.17 U
MW-L	MW-L-180-032819	03/28/19	WD, 180	< 0.13 U	< 0.17 U
MW-L	MW-L-245-030319	03/03/19	WD, 245	14	15
MW-L	MW-L-90-032919	03/29/19	WD, 90	19	18
MW-L	MW-L-225-032919	03/29/19	WD, 225	410	380
MW-M	MW-M-VAS-52-57	03/28/19	52 - 57	29	28
MW-M	MW-M-VAS-72-77	03/29/19	72 - 77	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-107-112	03/30/19	107 - 112	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-147-152	03/31/19	147 - 152	< 0.13 U	< 0.17 U
MW-M	MW-M-VAS-172-177	04/02/19	172 - 177	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-190-195	04/10/19	190 - 195	< 0.13 U	< 0.17 U
MW-M	MW-M-132-061519	6/16/19	WD	< 0.13 U	< 0.033 U
MW-M	MW-M-193-061419	6/14/19	WD	< 0.13 U	< 0.17 U
MW-M	MW-M-57-061719	6/17/19	WD	0.715 J	0.72
MW-M	MW-M-95-061619	6/16/19	WD	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-121-126	02/14/19	121 - 126	0.699 J	0.51
MW-N	MW-N-VAS-142-147	02/16/19	142 - 147	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-173-178	02/18/19	173 - 178	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-210-215	02/21/19	210 - 215	320	290
MW-N	MW-N-VAS-228-233	02/26/19	228 - 233	< 0.13 U	< 0.17 U

Table B-1. Groundwater Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
 PG&E Topock Compressor Station, Needles, California

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-N	MW-N-217-040219	04/02/19	WD, 217	110	110
MW-N	MW-N-237-040119	04/01/19	WD, 237	1600	1500
MW-N	MW-N-129-040319	04/03/19	WD, 129	45	46
MW-O	MW-O-VAS-101-106	05/10/19	101 - 106	< 0.13 U	< 0.033 U
MW-O	MW-O-VAS-106-111	05/11/19	106 - 111	< 0.13 U	< 0.17 U
MW-O	MW-O-VAS-12.5-17.5	05/08/19	12 - 18	< 0.13 U	0.163 J
MW-O	MW-O-VAS-136-141	05/11/19	136 - 141	< 0.13 U	< 0.17 U
MW-O	MW-O-VAS-51-56	05/09/19	51 - 56	< 0.13 U	< 0.033 U
MW-O	MW-O-VAS-66-71	05/09/19	66 - 71	< 0.13 U	0.178 J
MW-O	MW-O-140-071819	7/18/19	WD	< 0.13 U	< 0.17 U
MW-O	MW-O-30-071719	7/17/19	WD	< 0.13 U	< 0.033 U
MW-O	MW-O-66-071519	7/15/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-VAS-92-97	05/13/19	92 - 97	42	45
MW-R	MW-R-VAS-117-122	05/14/19	117 - 122	4.6	5.8
MW-R	MW-R-VAS-151-156	05/15/19	151 - 156	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-192-197	05/16/19	192 - 197	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-227-232	05/17/19	227 - 232	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-255-260	05/29/19	255 - 260	<0.13 U	< 0.17 U
MW-R	MW-R-VAS-269-274	05/30/19	269 - 274	<0.13 U	< 0.17 U
MW-R	MW-R-109-062819	6/28/19	WD	2.6	2.5
MW-R	MW-R-139-071319	7/13/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-192-070219	7/2/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-275-070919	7/9/19	WD	< 0.13 U	< 0.17 U
MW-W	MW-W-VAS-7-12	03/27/19	7 - 12	0.266 J	< 0.17 U
MW-W	MW-W-VAS-22-27	03/28/19	22 - 27	< 0.13 U	< 0.33 U
MW-W	MW-W-31-040419	04/04/19	WD, 31	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-12-17	06/25/19	12-17	1.2	< 0.033 U
MW-X	MW-X-VAS-32-37	06/26/19	32-37	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-71-76	6/27/19	71 - 76	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-107-112	6/27/19	107-112	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-112-117	6/28/19	112-117	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-152-157	6/29/19	152-157	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-182-187	6/29/19	182-187	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-207-212	6/30/19	207-212	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-245-250	7/1/19	245-250	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-292-297	7/2/19	292-297	< 0.13 U	< 0.17 U

Table B-1. Groundwater Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
 PG&E Topock Compressor Station, Needles, California

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-X	MW-X-VAS-337-342	7/11/19	337-342	0.564 J	< 0.17 U
MW-X	MW-X-VAS-382-387	7/13/19	382-387	0.582 J	< 0.17 U
MW-X	MW-X-VAS-412-417	7/15/19	412-417	38	< 0.17 U
MW-U	MW-U-VAS-137-142	04/12/19	137 - 142	0.818 J	1.4
MW-U	MW-U-VAS-181-186	04/13/19	181 - 186	< 0.13 U	0.112 J
MW-U	MW-U-VAS-222-227	04/14/19	222 - 227	< 0.13 U	< 0.033 U
MW-U	MW-U-VAS-257-262	04/16/19	257 - 262	< 0.13 U	0.0896 J
MW-U	MW-U-VAS-287-292	04/17/19	287 - 292	< 0.13 U	< 0.033 U
MW-U	MW-U-VAS-317-322	04/24/19	317 - 322	< 0.13 U	< 0.17 U
MW-U	MW-U-183-050819	05/08/19	WD, 183	< 0.13 U	< 0.033 U
MW-U	MW-U-273-051019	05/10/19	WD, 273	< 0.13 U	< 0.033 U
IRZ-9	IRZ-9-VAS-27-32	12/03/18	27 - 32	120	120
IRZ-9	IRZ-9-VAS-47-52	12/04/18	47 - 52	< 0.13 U	< 0.033 U
IRZ-9	IRZ-9-VAS-62-67	12/04/18	62 - 67	< 0.13 U	< 0.033 U
IRZ-9	IRZ-9-VAS-182-187	12/11/18	182 - 187	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-207-212	12/13/18	207 - 212	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-232-237	12/13/18	232 - 237	0.811 J	< 0.17 U
IRZ-9	IRZ-9-VAS-264-269	12/15/18	264 - 269	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-276-281	12/16/18	276 - 281	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-292-297	12/18/18	292 - 297	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-32-37	11/17/18	32 - 37	170	220
IRZ-13	IRZ-13-VAS-57-62	11/18/18	57 - 62	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-102-107	11/19/18	102 - 107	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-142-147	11/19/18	142 - 147	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-180-185	11/27/18	180 - 185	230	190
IRZ-13	IRZ-13-VAS-197-202	11/28/18	197 - 202	< 0.13	< 0.83
IRZ-13	IRZ-13-VAS-224-229	11/28/18	224 - 229	< 0.13	< 0.83
IRZ-13	IRZ-13-VAS-237-242	11/29/18	237 - 242	< 0.13 U	< 0.17 U
IRZ-15	IRZ-15-VAS-32-37	11/01/18	32 - 37	13	13
IRZ-15	IRZ-15-VAS-62-67	11/02/18	62 - 67	< 0.65 U	0.459 J
IRZ-15	IRZ-15-VAS-102-107	11/03/18	102 - 107	< 0.65 U	< 0.17 U
IRZ-15	IRZ-15-VAS-132-137	11/04/18	132 - 137	0.228 J	< 0.17 U
IRZ-15	IRZ-15-VAS-162-167	11/05/18	162 - 167	3400	3200
IRZ-15	IRZ-15-VAS-182-187	11/06/18	182 - 187	130	140
IRZ-15	IRZ-15-VAS-222-227	11/07/18	222 - 227	< 0.13 U	< 0.17 U
IRZ-16	IRZ-16-VAS-27-32	02/20/19	27 - 32	480	480
IRZ-16	IRZ-16-VAS-57-62	02/20/19	57 - 62	< 0.33 U	< 0.33 U

Table B-1. Groundwater Sampling Results

*July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California*

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
IRZ-16	IRZ-16-VAS-102-107	02/21/19	102 - 107	< 0.33 U	< 0.33 U
IRZ-16	IRZ-16-VAS-132-137	02/26/19	132 - 137	< 0.17 U	< 0.17 U
IRZ-16	IRZ-16-VAS-147-152	02/27/19	147 - 152	< 0.17 U	< 0.17 U
IRZ-16	IRZ-16-VAS-172-177	02/27/19	172 - 177	110	110
IRZ-16	IRZ-16-VAS-192-197	02/28/19	192 - 197	< 0.17 U	< 0.17 U
IRZ-17	IRZ-17-VAS-32-37	03/02/19	32 - 37	78	67
IRZ-17	IRZ-17-VAS-62-67	03/02/19	62 - 67	0.750 J	0.604 J
IRZ-17	IRZ-17-VAS-102-107	03/03/19	102 - 107	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-132-137	03/13/19	132 - 137	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-137-142	03/12/19	137 - 142	< 0.13 U	< 0.13 U
IRZ-17	IRZ-17-VAS-142-147	03/04/19	142 - 147	68	84
IRZ-17	IRZ-17-VAS-147-152	03/12/19	147 - 152	< 0.13 U	< 0.33 U
IRZ-17	IRZ-17-VAS-152-157	03/04/19	152 - 157	16	7.0
IRZ-17	IRZ-17-VAS-162-167	03/04/19	162 - 167	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-172-177	03/05/19	172 - 177	< 0.13 U	< 0.17 U
IRZ-20	IRZ-17-VAS-197-202	03/06/19	197 - 202	< 0.13 U	< 0.17 U
IRZ-20	IRZ-17-VAS-217-222	03/06/19	217 - 222	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-112-117	10/22/18	112 - 117	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-131-136	10/23/18	131 - 136	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-173-178	10/24/18	173 - 178	< 0.13 U	< 0.83 U
IRZ-21	IRZ-21-VAS-52-57	12/15/18	52 - 57	100	97
IRZ-21	IRZ-21-VAS-77-82	12/16/18	77 - 82	1.3	1.1
IRZ-21	IRZ-21-VAS-112-117	12/16/18	112 - 117	< 0.13 U	< 0.17 U
IRZ-21	IRZ-21-VAS-132-137	12/17/18	132 - 137	< 0.13 U	< 0.17 U
IRZ-21	IRZ-21-VAS-147-152	12/18/18	147 - 152	4000	3600
IRZ-23	IRZ-23-VAS-67-72	12/01/18	67 - 72	86	85
IRZ-23	IRZ-23-VAS-92-97	12/01/18	92 - 97	0.453 J	< 0.033 U
IRZ-23	IRZ-23-VAS-122-127	12/02/18	122 - 127	2100	2000
IRZ-23	IRZ-23-VAS-139-144	12/02/18	139 - 144	3400	3000
IRZ-25	IRZ-25-VAS-52-57	12/05/18	52 - 57	4300	3500
IRZ-25	IRZ-25-VAS-67-72	12/05/18	67 - 72	750	620
IRZ-25	IRZ-25-VAS-92-97	12/06/18	92 - 97	140	130
IRZ-25	IRZ-25-VAS-112-117	12/11/18	112 - 117	< 0.13 U	< 0.17 U
IRZ-25	IRZ-25-VAS-147-152	12/11/18	147 - 152	3800	3600
IRZ-25	IRZ-25-VAS-162-167	12/13/18	162 - 167	3000	3000
IRZ-27	IRZ-27-VAS-52-57	03/15/19	52 - 57	4500	4400
IRZ-27	IRZ-27-VAS-72-77	03/17/19	72 - 77	0.338 J	< 0.033 U

Table B-1. Groundwater Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
 PG&E Topock Compressor Station, Needles, California

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
IRZ-27	IRZ-27-VAS-102-107	03/18/19	102 - 107	< 0.13 U	< 0.17 U
IRZ-27	IRZ-27-VAS-132-137	03/20/19	132 - 137	1200	1300
IRZ-39	IRZ-39-VAS-27-32	03/30/19	27 - 32	31	29
RB-2	RB-2-VAS-102-107	7/1/19	102-107	< 0.13 U	< 0.033 U
RB-2	RB-2-VAS-142-147	7/9/19	142-147	0.270 J	< 0.17 U
RB-2	RB-2-VAS-172-177	7/12/19	172-177	0.233 J	< 0.17 U
RB-2	RB-2-VAS-202-207	7/14/19	202-207	0.218 J	< 0.17 U
RB-2	RB-2-VAS-237-242	7/15/19	237-242	0.233J	< 0.17 U
RB-2	RB-2-VAS-274-279	7/18/19	274-279	0.514 J	< 0.17 U
RB-2	RB-2-VAS-287-292	7/26/19	287-292	Data not yet available	< 0.17 U
RB-2	RB-2-VAS-36.5-41.5	6/29/19	36 - 42	< 0.13 U	< 0.033 U
RB-2	RB-2-VAS-72-77	6/30/19	72 - 77	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-15-20	04/26/19	15 - 20	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-50-55	04/27/19	50 - 55	< 0.13 U	0.100 J
RB-3	RB-3-VAS-80-85	04/27/19	80 - 85	< 0.13 U	0.132 J
RB-3	RB-3-VAS-120-125	04/28/19	120 - 125	< 0.13 U	< 0.17 U
RB-3	RB-3-VAS-150-155	04/29/19	150 - 155	0.257 J	< 0.17 U
RB-3	RB-3-VAS-180-185	04/29/19	180 - 185	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-205-210	04/30/19	205 - 210	< 0.13 U	< 0.17 U
RB-4	RB-4-VAS-15-20	04/12/19	15 - 20	< 0.13 U	0.0556 J
RB-4	RB-4-VAS-41-46	04/12/19	41 - 46	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-81-86	04/12/19	81 - 86	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-121-126	04/13/19	121 - 126	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-136-141	04/13/19	136 - 141	< 0.13 U	< 0.17 U
RB-4	RB-4-VAS-155-160	04/17/19	155 - 160	< 0.13 U	< 0.17 U
RB-5	RB-5-VAS-12-17	04/04/19	12 - 17	0.235 J	0.125 J
RB-5	RB-5-VAS-42-47	04/09/19	42 - 47	< 0.13 U	< 0.033 U
RB-5	RB-5-VAS-82-87	04/09/19	82 - 87	0.769 J	0.127 J

Notes:

µg/L = micrograms per liter

ft bgs = feet below ground surface

J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but not detected at the analyte method detection limit indicated

VAS = vertical aquifer sampling

WD = sample from well development, depth noted is from bottom of screen

Table B-2. Specific Capacity Test for IRZ-20*July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup**PG&E Topock Compressor Station, Needles, California*

Upper Screen (49 to 71 feet bgs)	Lower Screen (137-155 feet bgs)
<p>7/11/19 – Conducted Specific Capacity Test</p> <p>Pumping rate approximately 19.75 gallons per minute (gpm)</p> <ul style="list-style-type: none"> • Duration approximately 22 minutes • Purged approximately 351.39 gallons • Drawdown approximately 1.84 feet <p>Pumping rate approximately 6.75 gpm</p> <ul style="list-style-type: none"> • Duration approximately 110 minutes • Purged approximately 733.42 gallons • Drawdown approximately 0.68 feet <p>Pumping rate approximately 13 gpm</p> <ul style="list-style-type: none"> • Duration approximately 120 minutes • Purged approximately 1538.98 gallons • Drawdown approximately 1.33 feet <p>Pumping rate approximately 19.6 gpm</p> <ul style="list-style-type: none"> • Duration approximately 136 minutes • Purged approximately 2598.62 gallons • Drawdown approximately 2.08 feet <p>7/12/19 – Conducted Specific Capacity Test</p> <p>Pumping rate approximately 32.9 gpm</p> <ul style="list-style-type: none"> • Duration approximately 128 minutes • Purged approximately 4198.63 gallons • Drawdown approximately 3.37 feet <p>Total Volume Purged – Approximately 9,421 gallons stored in frac tanks on the MW-20 bench</p> <p>Total Testing Hours – 8.6 Hours</p>	<p>6/29/2019 – Conducted Initial Specific Capacity Test</p> <p>Pumping rate approximately 6.5 gpm</p> <ul style="list-style-type: none"> • Duration approximately 12 minutes • Purged approximately 68.07 gallons • Drawdown approximately 2.85 <p>Pumping rate approximately 19.2 gpm</p> <ul style="list-style-type: none"> • Duration approximately 16 minutes • Purged approximately 301.22 gallons • Drawdown approximately 9.19 feet <p>6/30/19 – Conducted Specific Capacity Test</p> <p>Pumping rate approximately 6.6 gpm</p> <ul style="list-style-type: none"> • Duration 2 hours • Purged approximately 737.00 gallons • Drawdown approximately 3.26 feet <p>Pumping rate approximately 13.2 gpm</p> <ul style="list-style-type: none"> • Duration 2 hours • Purge approximately 1655.54 gallons • Drawdown approximately 6.54 feet <p>Pumping rate approximately 19.6 gpm</p> <ul style="list-style-type: none"> • Duration 2 hours • Purged approximately 2395.82 gallons • Drawdown approximately 14.46 feet <p>Pumping rate approximately 33.5 gpm</p> <ul style="list-style-type: none"> • Duration approximately 2 hours • Purged approximately 4104.90 gallons • Drawdown approximately 16.39 feet <p>Total Volume Purged – Approximately 9,262 gallons stored in frac tanks on the MW-20 bench</p> <p>Total Testing Hours – 8.5 Hours</p>

Date Started:	05/13/2019	Surface Elevation:	N/A	Well ID: MW-M-57, MW-M-95
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	10-12 inches	
Logger:	M. Andrews/C. Stewart	Water Level Start:	44.23 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/17/2019	
Total Depth:	99 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1			NR		(0.0 - 2.0') Concrete Pad (0.5 - 42.0') 2" PVC Sch 80 Casing		(0.0 - 2.0') 9 bags Note: 2.5 x 2.5 ft concrete pad with 18 diameter lockable vault, King Kon-Crete 4000 PSI
2							
3							
4					(2.0 - 6.0') Portland Cement 6% Bentonite	(2.0 - 6.0') 22.2 gallons	(2.0 - 6.0') 50 gallons (125%) Note: Type I, II and V with 6% Bentonite
5							
6							
7					(6.0 - 8.5') Bentonite seal chips	(6.0 - 8.5') 2.57 bags	(6.0 - 8.5') 8 bags (211%) Note: Puregold Medium Chips, use to fill void
8							
9					(8.5 - 8.8') Portland Cement 6% Bentonite	(8.5 - 8.8') 1.2 gallons	(8.5 - 8.8') 50 gallons (4067%) Note: Type I, II and V with 6% Bentonite, void took grout
10							
11			NR		(10.5 - 11.5') Centralizer	(8.8 - 13.5') 3.45 bags	(8.8 - 13.5') 8 bags (132%) Note: Halliburton Uniform Granular, boulder fell into borehole about 10' bgs, during casing pull, no apparent damage to well casing
12					(8.8 - 13.5') Bentonite seal chips		
13							
14							
15							
16							
17					(13.5 - 25.0') Grout	(13.5 - 25.0') 45.5 gallons	(13.5 - 25.0') 100 gallons (120%) Note: Type I, II and V with 6% Bentonite
18							
19							
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 05/13/2019	Surface Elevation: N/A	Well ID: MW-M-57, MW-M-95
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 10-12 inches	
Logger: M. Andrews/C. Stewart	Water Level Start: 44.23 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/17/2019	
Total Depth: 99 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21					(0.5 - 42.0') 2" PVC Sch 80 Casing		
22							
23					(13.5 - 25.0') Grout	(13.5 - 25.0') 45.5 gallons	(13.5 - 25.0') 100 gallons (120%) Note: Type I, II and V with 6% Bentonite
24							
25							
26							
27							
28							
29			NR				
30					(25.0 - 36.0') Bentonite seal chips	(25.0 - 36.0') 8.08 bags	(25.0 - 36.0') 9 bags (11%) Note: Puregold Medium Chips
31							
32							
33							
34							
35							
36							
37							
38		Topock - Alluvium Deposits	SM		(36.0 - 61.0') Cemex #3 MESH (8x10)	(36.0 - 61.0') 25.4 bags	(36.0 - 61.0') 39 bags (54%) Note: Lapis Lustre Sand
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started:	05/13/2019	Surface Elevation:	N/A	Well ID: MW-M-57, MW-M-95
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	10-12 inches	
Logger:	M. Andrews/C. Stewart	Water Level Start:	44.23 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/17/2019	
Total Depth:	99 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41		Topock - Alluvium Deposits	SM		(0.5 - 42.0') 2" PVC Sch 80 Casing (40.5 - 41.5') Centralizer		
42							
43		Topock - Alluvium Deposits	SC		(42.0 - 57.0') 2" Sch 80 PVC (20-slot) Screen		
44							
45		Topock - Alluvium Deposits	SM				
46							
47							
48		Topock - Alluvium Deposits	SC				
49							
50		Topock - Alluvium Deposits	SM		(36.0 - 61.0') Cemex #3 MESH (8x10)	(36.0 - 61.0') 25.4 bags	(36.0 - 61.0') 39 bags (54%) Note: Lapis Lustre Sand
51							
52		Topock - Alluvium Deposits	GM				
53							
54	MW-M-VAS-52-57 (28 ppb) 3/28/2019 11:10	Topock - Alluvium Deposits	SM				
55							
56							
57							
58			NR		(57.5 - 58.5') Centralizer		
59					(57.0 - 59.4') Sump and End Cap		
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started:	05/13/2019	Surface Elevation:	N/A	Well ID: MW-M-57, MW-M-95
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	10-12 inches	
Logger:	M. Andrews/C. Stewart	Water Level Start:	44.23 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/17/2019	
Total Depth:	99 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61					(36.0 - 61.0') Cemex #3 MESH (8x10)	(36.0 - 61.0') 25.4 bags	(36.0 - 61.0') 39 bags (54%) Note: Lapis Lustre Sand
62							
63							
64			NR				
65							
66					(61.0 - 70.0') Bentonite seal pellets	(61.0 - 70.0') 7.9 buckets	(61.0 - 70.0') 8 buckets (1%) Note: Pel-Plug (TR30) 3/8" <input type="checkbox"/>
67		Topock - Alluvium Deposits	GM				
68							
69		Topock - Alluvium Deposits	SM				
70					(69.5 - 70.5') Centralizer	(8.0 - 99.0') 10" Borehole	
71							
72							
73							
74	MW-M-VAS-72-77 (<0.033 U ppb) 3/29/2019 14:01	Topock - Alluvium Deposits	GM				
75					(70.0 - 99.0') Cemex #3 MESH (8x10)	(70.0 - 99.0') 32 bags	(70.0 - 99.0') 31 bags (-3%) Note: Lapis Lustre Sand
76						(75.0 - 95.0') 2" Sch 80 PVC (20-slot) Screen	
77							
78		Topock - Alluvium Deposits	GM				
79							
80							

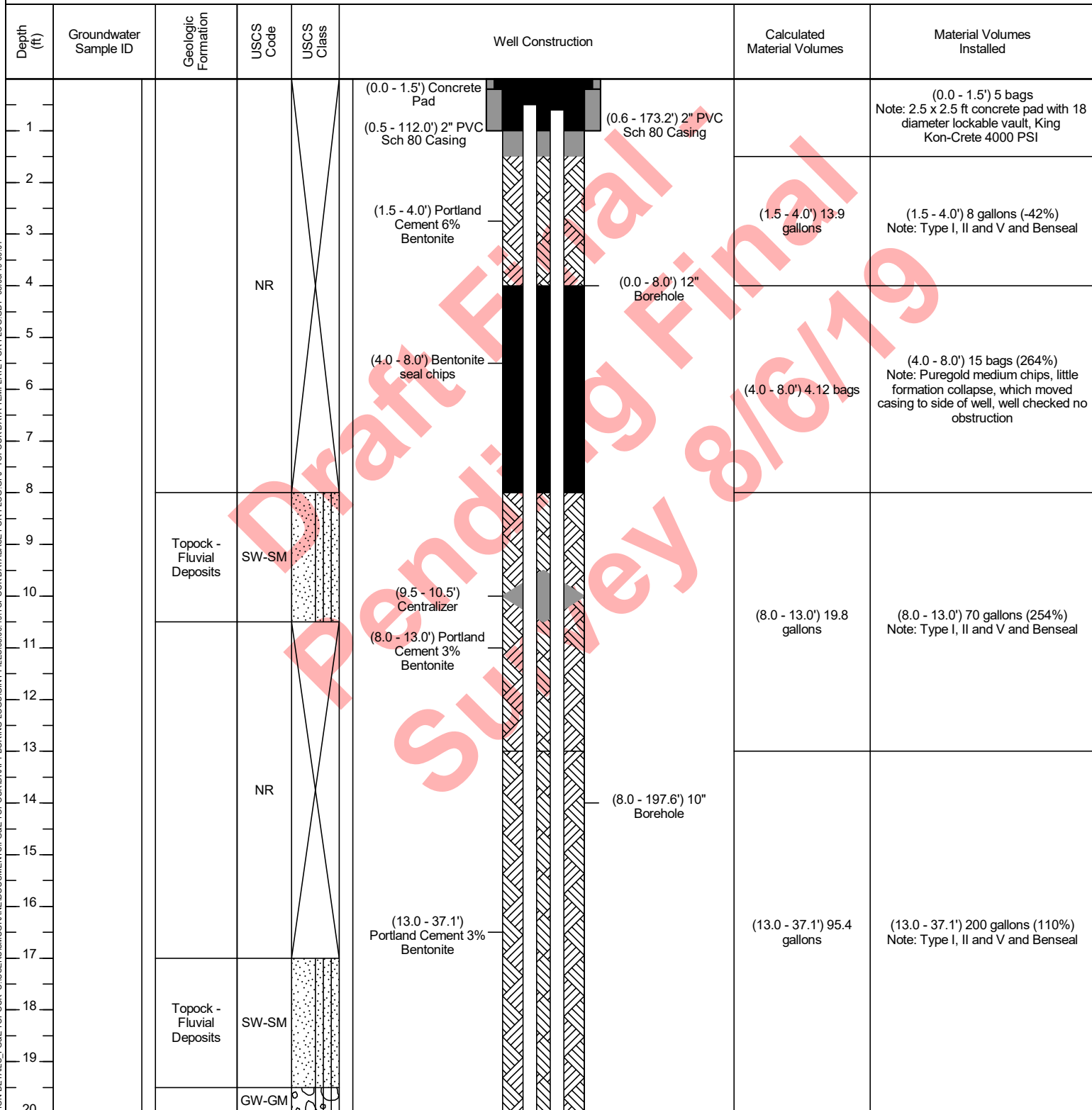
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 05/13/2019	Surface Elevation: N/A	Well ID: MW-M-57, MW-M-95
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 10-12 inches	
Logger: M. Andrews/C. Stewart	Water Level Start: 44.23 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/17/2019	
Total Depth: 99 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81		Topock - Alluvium Deposits	GM				
82							
83							
84		Topock - Alluvium Deposits	ML				
85							
86							
87		Topock - Alluvium Deposits	SM				
88							
89		Topock - Alluvium Deposits	SC				
90					(70.0 - 99.0') Cemex #3 MESH (8x10)		
91							
92							
93		Topock - Alluvium Deposits	SW-SM				
94							
95							
96					(95.5 - 96.5') Centralizer		
97							
98			NR				
99							
100					End of Boring at 99.0' bgs.		












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Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed
21		Topock - Fluvial Deposits	GW-GM		(0.5 - 112.0') 2" PVC Sch 80 Casing			(0.6 - 173.2') 2" PVC Sch 80 Casing	
22									
23									
24									
25									
26									
27		Topock - Fluvial Deposits	SW-SM		(13.0 - 37.1') Portland Cement 3% Bentonite			(13.0 - 37.1') 95.4 gallons	(13.0 - 37.1') 200 gallons (110%) Note: Type I, II and V and Benseal
28									
29									
30									
31									
32									
33									
34									
35									
36									
37		Topock - Fluvial Deposits	SM		(34.5 - 35.5') Centralizer				
38									
39									
40									
					(37.1 - 46.0') Bentonite seal chips			(37.1 - 46.0') 6.54 bags	(37.1 - 46.0') 24 bags (267%) Note: Puregold Medium Chips. Bentonite sinking into high solids grout.

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started:	03/20/2019	Surface Elevation:	N/A	Well ID: MW-M-132, MW-M-193
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase I
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	4-12 inches	
Logger:	C. Bonessi/R. Moniz	Water Level Start:	44.85 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/15/2019	
Total Depth:	216 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41		Topock - Fluvial Deposits	SM		(0.5 - 112.0') 2" PVC Sch 80 Casing		
42							
43					(37.1 - 46.0') Bentonite seal chips	(37.1 - 46.0') 6.54 bags	(37.1 - 46.0') 24 bags (267%) Note: Puregold Medium Chips. Bentonite sinking into high solids grout.
44		Topock - Alluvium Deposits	GM				
45							
46							
47							
48							
49		Topock - Alluvium Deposits	GM				
50							
51							
52							
53					(46.0 - 94.3') High Solids Grout	(46.0 - 94.3') 191.2 gallons	(46.0 - 94.3') 228 gallons (19%) Note: Aqua Guard Bentonite Grout
54	MW-M-VAS-52-57 (28 ppb) 3/28/2019 11:10						
55		Topock - Alluvium Deposits	GW				
56							
57							
58							
59		Topock - Alluvium Deposits	SM				
60							

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Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61		Topock - Alluvium Deposits	SM		(0.5 - 112.0') 2" PVC Sch 80 Casing		
62		Topock - Alluvium Deposits	GM				
63							
64		Topock - Alluvium Deposits	SM		(64.5 - 65.5') Centralizer		
65							
66							
67							
68							
69							
70		Topock - Alluvium Deposits	GM		(46.0 - 94.3') High Solids Grout	(46.0 - 94.3') 191.2 gallons	(46.0 - 94.3') 228 gallons (19%) Note: Aqua Guard Bentonite Grout
71							
72							
73							
74	MW-M-VAS-72-77 (<0.033 U ppb) 3/29/2019 14:01						
75							
76		Topock - Alluvium Deposits	SW-SM				
77							
78		Topock - Alluvium Deposits	GM				
79							
80		Topock - Alluvium Deposits	SW-SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started:	03/20/2019	Surface Elevation:	N/A	Well ID: MW-M-132, MW-M-193
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase I
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	4-12 inches	
Logger:	C. Bonessi/R. Moniz	Water Level Start:	44.85 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/15/2019	
Total Depth:	216 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81		Topock - Alluvium Deposits	ML		(0.5 - 112.0') 2" PVC Sch 80 Casing		
82							
83		Topock - Alluvium Deposits	GW-GM				
84							
85							
86							
87							
88					(46.0 - 94.3') High Solids Grout	(46.0 - 94.3') 191.2 gallons	(46.0 - 94.3') 228 gallons (19%) Note: Aqua Guard Bentonite Grout
89		Topock - Alluvium Deposits	SM				
90							
91							
92							
93							
94							
95							
96		Topock - Alluvium Deposits	ML		(94.3 - 96.3') Cemex #3 MESH (8x10)	(94.3 - 96.3') 2.1 bags	(94.3 - 96.3') 6 bags (186%) Note: Lapis Lustre Sand, drillers were concerned about bentonite swelling in casing overnight placed sand in casing and open borehole, sand filled void
97							
98		Topock - Alluvium Deposits	SM		(96.3 - 106.9') Bentonite seal pellets	(96.3 - 106.9') 9 buckets	(96.3 - 106.9') 9.5 buckets (6%) Note: Pel-Plug (TR30) 3/8"
99							
100					(99.5 - 100.5') Centralizer		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started:	03/20/2019	Surface Elevation:	N/A	Well ID: MW-M-132, MW-M-193
Date Completed:	07/30/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase I
Driller Name:	Tyler Alymer	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	C. Winland/J. Candelaria	Borehole Diameter:	4-12 inches	
Logger:	C. Bonessi/R. Moniz	Water Level Start:	44.85 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	6/15/2019	
Total Depth:	216 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
101		Topock - Alluvium Deposits	ML		(99.5 - 100.5') Centralizer		
102					(0.5 - 112.0') 2" PVC Sch 80 Casing		
103							
104		Topock - Alluvium Deposits	SM		(96.3 - 106.9') Bentonite seal pellets	(96.3 - 106.9') 9 buckets	(96.3 - 106.9') 9.5 buckets (6%) Note: Pel-Plug (TR30) 3/8"
105							
106							
107							
108							
109	MW-M-VAS-107-112 (<0.033 U ppb) 3/30/2019 13:59	Topock - Alluvium Deposits	SM				
110							
111							
112							
113					(112.0 - 132.0') 2" Sch 80 PVC (20-slot) Screen		
114					(106.9 - 136.0') Cemex #3 MESH (8x10)	(106.9 - 136.0') 30.2 bags	(106.9 - 136.0') 35 bags (16%) Note: Lapis Lustre Sand
115							
116							
117		Topock - Alluvium Deposits	GM				
118							
119							
120							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
121		Topock - Alluvium Deposits	GM		(112.0 - 132.0') 2" Sch 80 PVC (20-slot) Screen		
122							
123		Topock - Alluvium Deposits	SM				
124							
125		Topock - Alluvium Deposits	GW-GM				
126							
127							
128					(106.9 - 136.0') Cemex #3 MESH (8x10)	(106.9 - 136.0') 30.2 bags	(106.9 - 136.0') 35 bags (16%) Note: Lapis Lustre Sand
129							
130							
131							
132							
133					(132.5 - 133.5') Centralizer		
134		Topock - Alluvium Deposits	GM		(132.0 - 134.4') Sump and End Cap		
135							
136							
137							
138					(136.0 - 163.0') Bentonite seal pellets	(136.0 - 163.0') 23.8 buckets	(136.0 - 163.0') 25 buckets (5%) Note: Pel-Plug (TR30) 3/8"
139							
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
141		Topock - Alluvium Deposits	GM		(0.6 - 173.2') 2" PVC Sch 80 Casing		
142							
143							
144		Topock - Alluvium Deposits	ML				
145							
146							
147							
148							
149	MW-M-VAS-147-152 (<0.17 U ppb) 3/31/2019 15:21	Topock - Alluvium Deposits	SM		(136.0 - 163.0') Bentonite seal pellets	(8.0 - 197.6') 10" Borehole	(136.0 - 163.0') 23.8 buckets
150							(136.0 - 163.0') 25 buckets (5%) Note: Pel-Plug (TR30) 3/8"
151							
152							
153							
154							
155							
156							
157		Topock - Alluvium Deposits	GM				
158							
159							
160							

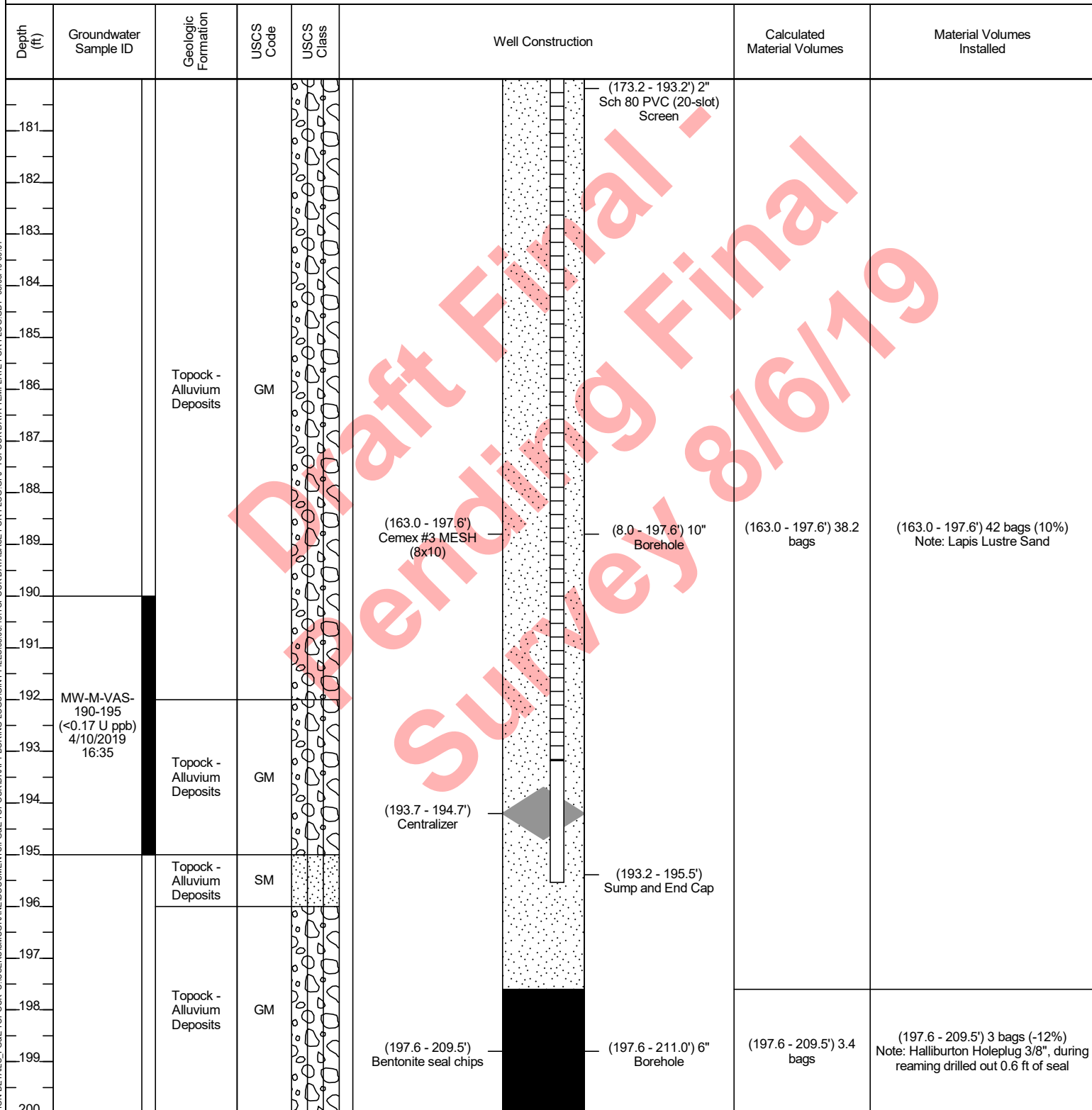
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
161							
162							
163		Topock - Alluvium Deposits	GM		(0.6 - 173.2') 2" PVC Sch 80 Casing		
164							
165							
166							
167							
168		Topock - Alluvium Deposits	SM				
169							
170							
171							
172					(136.0 - 163.0') Bentonite seal pellets	(136.0 - 163.0') 23.8 buckets	(136.0 - 163.0') 25 buckets (5%) Note: Pel-Plug (TR30) 3/8"
173							
174	MW-M-VAS-172-177 (<0.033 U ppb) 4/2/2019 14:57	Topock - Alluvium Deposits	GM		(8.0 - 197.6') 10" Borehole		
175							
176							
177					(163.0 - 197.6') Cemex #3 MESH (8x10)	(163.0 - 197.6') 38.2 bags	(163.0 - 197.6') 42 bags (10%) Note: Lapis Lustre Sand
178							
179		Topock - Alluvium Deposits	GM		(173.2 - 193.2') 2" Sch 80 PVC (20-slot) Screen		
180							


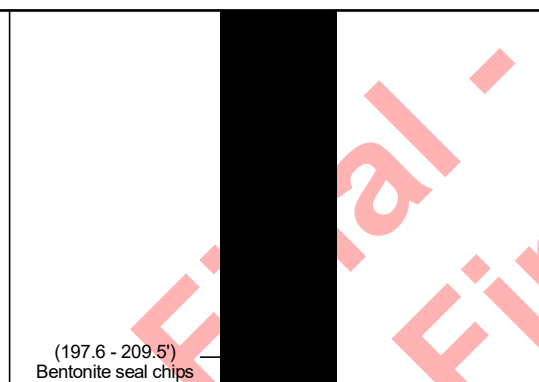

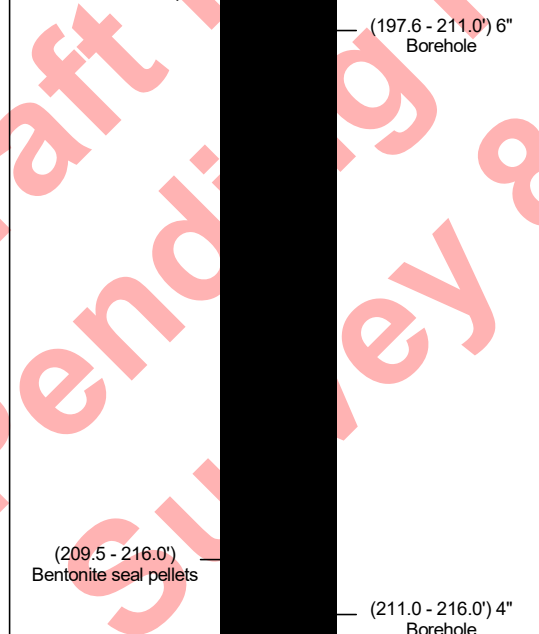

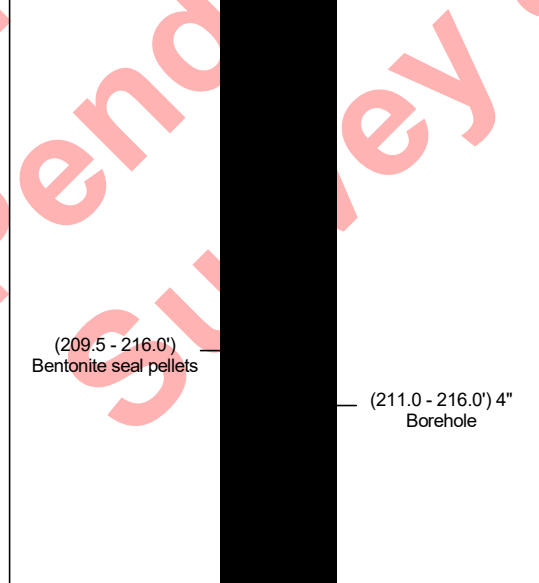
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured post development

Date Started: 03/20/2019	Surface Elevation: N/A	Well ID: MW-M-132, MW-M-193
Date Completed: 07/30/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase I
Driller Name: Tyler Alymer	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: C. Winland/J. Candelaria	Borehole Diameter: 4-12 inches	
Logger: C. Bonessi/R. Moniz	Water Level Start: 44.85 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 6/15/2019	
Total Depth: 216 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
201	--no sample-- (Interval did not produce.) 4/10/2019 12:28	Topock - Alluvium Deposits	GM			(197.6 - 209.5') 6" Borehole	(197.6 - 209.5') 3.4 bags	(197.6 - 209.5') 3 bags (-12%) Note: Halliburton Holeplug 3/8", during reaming drilled out 0.6 ft of seal
202								
203								
204								
205		Topock - Bedrock - metadiorite	GM			(209.5 - 216.0') 4" Borehole	(209.5 - 216.0') 1.2 buckets	(209.5 - 216.0') 1 buckets (-17%) Note: Pel-Plug (TR30) 3/8"
206								
207								
208								
209		Topock - Bedrock - metadiorite						
210								
211								
212								
213								
214								
215								
216								
End of Boring at 216.0' bgs.								
217								
218								
219								
220								





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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	0				NR		(0.0 - 8.0') (NR); Hand cleared for utility clearance to 1 foot bgs, ~2 foot boulder encountered had to used rig to break boulder loose, drilled to 8 ft. bgs with no core collected, no recovery	(0.0 - 8.0') Added 10 gallons of water to hydrate bentonite mud tub seal.	(0.0 - 37.0') No water used
2									
3									
4									
5	0				NR				
6									
7									
8									
9		No Sieve Samples Collected		Topock - Fluvial Deposits	SW-SM		(8.0 - 10.5') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); light olive brown (2.5Y 5/4); very fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, subangular to subround; trace cobbles, subangular to subround; trace silt; trace clay; dry; some moisture present due to hydration of bentonite	(8.0 - 32.0') Soft drilling, formation collapsing after every run	
10									
11									
12									
13	24				NR		(10.5 - 17.0') (NR); No recovery.		
14									
15									
16									
17				Topock - Fluvial Deposits	SW-SM		(17.0 - 19.5') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); light olive brown (2.5Y 5/4); very fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, subangular to subround; trace cobbles, subangular to subround; trace silt; trace clay; dry; some moisture present due to hydration of bentonite		
18									
19									
20									
					GW-GM		(19.5 - 27.0') Topock - Fluvial Deposits; Well graded gravel with silt		

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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	120			Topock - Fluvial Deposits	GW-GM		and sand (GW-GM); light olive brown (2.5Y 5/4); granules to very large pebbles, subangular to subround; some very fine to very coarse grained sand, subangular to subround; trace cobbles, subangular to subround; trace silt; trace clay; dry	(8.0 - 32.0') Soft drilling, formation collapsing after every run	(0.0 - 37.0') No water used
22									
23									
24									
25									
26	60	No Sieve Samples Collected		Topock - Fluvial Deposits	SW-SM		(27.0 - 38.0') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); light olive brown (2.5Y 5/4); very fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, subangular to subround; little silt; trace cobbles, subangular to subround; dry	(32.0 - 37.0') Hard drilling, due to boulder, borehole collapsing after each clean out run. rod broke while doing clean out at 35 ft bgs	(37.0 - 205.0') 5 gallons of water used; 5 gallons of water recovered; 0 gallons of water lost
27									
28									
29									
30									
31	60			Topock - Fluvial Deposits	SM		(32'); iron oxide staining; ~2 ft. diameter boulder	(37.0 - 42.0') Drill rods chattering, change geologist from CB to RM (37.1') Change in geologist from CB to RM.	(37.0 - 205.0') No used
32									
33									
34									
35									
36	60			Topock - Fluvial Deposits			(38.0 - 42.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; little cobbles, subangular; dry to moist; weak cementation; iron oxide staining; cobbles composed of sandstone/breccia		
37									
38									
39									
40									

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Date Started:	<u>03/20/2019</u>	Surface Elevation:	<u>N/A</u>	Boring No.: <u>MW-Md</u>
Date Completed:	<u>04/30/2019</u>	Northing (NAD83):	<u>N/A</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>N/A</u>	Client: <u>PG&E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>216 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type:	<u>Borat Longyear Track Mount</u>	Borehole Diameter:	<u>4-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Driller Name:	<u>Tyler Alymer</u>	Depth to First Water:	<u>44.85 ft bgs</u>	
Drilling Asst:	<u>C. Winland/J. Candelaria</u>	Sampling Method:	<u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger:	<u>C.Bonessi/R.Moniz/D.Maurer</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

SOIL BORING LOG PG&E TOPOCK C:\USERS\SMC\GRAND\DOCUMENTS\PG&E TOPOCK\DATA\TEMPLATE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 07/29/19 16:05

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured during first VAS interval

Date Started:	03/20/2019	Surface Elevation:	N/A	Boring No.: MW-Md	
Date Completed:	04/30/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	216 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Borat Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	44.85 ft bgs		
Drilling Asst:	C. Winland/J. Candelaria	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	C. Bonessi/R. Moniz/D. Maurer	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	114			Topock - Alluvium Deposits	SM		clay; trace cobbles, angular to subround; moist	(57.0 - 67.0') Hard drilling and became harder at 61ft	(37.0 - 205.0') No used
62				Topock - Alluvium Deposits	GM		(61.0 - 63.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); light brownish gray / pale yellowish brown (10YR 6/2); granules to very large pebbles, subangular to subround; little very fine to medium grained sand, subangular to subround; little silt; trace clay; dry		
63									
64									
65				Topock - Alluvium Deposits	SM		(63.0 - 67.0') Topock - Alluvium Deposits; Silty sand (SM); brown (7.5YR 4/3); very fine grained to medium grained, angular to subround; little granules to very large pebbles, angular to subround; little silt; trace cobbles, angular to subround; trace clay; dry; weak cementation; iron oxide staining		
66							(65'); potential caliche deposits in sediments		
67									
68							(67.0 - 75.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3); granules to very large pebbles, angular to subround; some cobbles, angular to subround; some very fine to very coarse grained sand, angular to subround; little silt; moist	(67.0 - 77.0') Softer drilling	
69									
70							(69.5') brown (10YR 5/3); some silt; little cobbles, angular to subround; little clay; moist; weak cementation		
71				Topock - Alluvium Deposits	GM		(70.5'); dry; potential caliche deposits in sediments (71'); moist		
72	120						(72'); wet; lens of green staining		
73									
74			MW-M-VAS-72-77 (<0.033 U ppb) 3/29/2019 14:01						
75									
76				Topock - Alluvium Deposits	SW-SM		(75.0 - 78.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW-SM); weak red (2.5YR 5/2); very fine grained to coarse grained, angular to subround; little granules to very large pebbles, angular to subround; little silt; trace cobbles, angular to subangular; wet		
77									
78								(77.0 - 87.0') Soft drilling, lost core 82 to 87 ft downhole	
79	120			Topock - Alluvium Deposits	GM		(78.0 - 79.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); weak red (2.5YR 4/2); granules to very large pebbles, angular to subround; little cobbles, angular to subround; little very fine to very coarse grained sand, angular to subround; little silt; little clay; wet		
80				Topock - Alluvium Deposits	SW-SM		(79.0 - 80.0') Topock - Alluvium Deposits; Poorly graded sand with silt and gravel (SW-SM); weak red (2.5YR 5/2); medium grained to very coarse grained, angular to subround; and granules to very large		

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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	120			Topock - Alluvium Deposits	ML		pebbles, angular to subround; little silt; trace cobbles, angular to subangular; wet (80.0 - 82.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 4/3); low plasticity; some very fine to medium grained sand, angular to subround; little granules to very large pebbles, angular to subangular; little clay; moist to wet; medium stiff	(77.0 - 87.0') Soft drilling, lost core 82 to 87 ft downhole	(37.0 - 205.0') No used
82				Topock - Alluvium Deposits	GW-GM		(82.0 - 84.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); weak red (2.5YR 5/2); granules to very large pebbles, angular to subround; some medium to very coarse grained sand, angular to subround; little cobbles, angular to subangular; little silt; wet		
83									
84									
85	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(84.0 - 95.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); medium grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; some silt; little cobbles, angular to subround; trace clay; moist; interbedded with layers of silty gravel, with sand and gravelly silt with sand	(87.0 - 97.0') Soft drilling, recovered 82 to 87 ft core	
86									
87									
88									
89									
90									
91									
92							(91.7'); dry; with lenses of potential caliche in sediments and weak cementation		
93	120			Topock - Alluvium Deposits	ML		(95.0 - 97.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 4/3); low plasticity; some medium to very coarse grained sand, angular to subround; little granules to very large pebbles, angular to subround; little cobbles, angular to subround; trace clay; moist		
94									
95									
96									
97	120			Topock - Alluvium Deposits	SM		(97.0 - 100.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); medium grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; some silt; trace cobbles, angular to subround; trace clay; moist; interbedded with layers of silty gravel with sand and gravelly silt with sand		
98									
99									
100									








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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	120			Topock - Alluvium Deposits	ML		(100.0 - 103.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 4/3); low plasticity; some very fine to medium grained sand, angular to subround; little granules to very large pebbles, angular to subround; trace cobbles, angular to subround; trace clay; moist; weak cementation; iron oxide staining (101'); dry; with lens of potential caliche in sediments and weak cementation	(97.0 - 127.0') Formation collapse during clean out drilling with 10 inch casing, soft drilling (97' to 107'), slightly rough drilling (107' to 109'), soft drilling (109' to 117'), soft drilling lost 5 feet of sample downhole (117' to 127') with 6 inch casing	(37.0 - 205.0') No used
102				Topock - Alluvium Deposits	SM		(103.5 - 105.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); grayish brown (2.5Y 5/2) and brown (7.5YR 4/3); medium grained to very coarse grained; little granules to very large pebbles, angular to subround; little silt; trace cobbles, angular to subround; trace clay; moist; interbedded color changes (104'); to 104.5', wet silty gravel lens		
103							(105.0 - 114.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); medium grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; some silt; trace cobbles, angular to subround; trace clay; moist; interbedded layers with poor to moderate gradation (106'); to 107', dry with green staining (107'); to 109.5', wet		
104	108	No Sieve Samples Collected	MW-M-VAS-107-112 (<0.033 U ppb) 3/30/2019 13:59	Topock - Alluvium Deposits	SM			(107.0') During reaming with 10-inch casing flapper bit broke, getting poor recovery, driller thinks material is getting pushed into formation or falling down 6-inch rathole	
105									
106									
107	120			Topock - Alluvium Deposits	GM		(114.5 - 122.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3); granules to very large pebbles, angular to subround; some very fine to medium grained sand, angular to subangular; some silt; little cobbles, angular to subround; trace clay; moist; green staining		
108									
109							(118.2'); sand lens at 118.2 ft		

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Date Started: <u>03/20/2019</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>MW-Md</u>
Date Completed: <u>04/30/2019</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>216 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Borat Longyear Track Mount</u>	Borehole Diameter: <u>4-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Driller Name: <u>Tyler Alymer</u>	Depth to First Water: <u>44.85 ft bgs</u>	
Drilling Asst: <u>C. Winland/J. Candelaria</u>	Sampling Method: <u>4 inch x 10 ft. Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>C. Bonessi/R. Moniz/D. Maurer</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Sean McGrane</u>	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	120			Topock - Alluvium Deposits	GM		(120.5'); weathered metamorphic cobble, black and green staining around cobble	(97.0 - 127.0') Formation collapse during clean out during with 10 inch casing, soft drilling (97' to 107'), slightly rough drilling (107' to 109'), soft drilling (109' to 117'), soft drilling lost 5 feet of sample downhole (117' to 127') with 6 inch casing	(37.0 - 205.0') No used
122				Topock - Alluvium Deposits	SM		(122.0 - 124.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark grayish brown / dark yellowish brown (10YR 4/2); very fine grained to very coarse grained, angular to subangular; little granules to very large pebbles, angular to subangular; little silt; trace clay; wet		
123				Topock - Alluvium Deposits	GW-GM		(124.0 - 128.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); light olive brown (2.5Y 5/6); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; little silt; trace cobbles; wet; iron oxide staining; occasional sandier and siltier lenses		
124							(126') brown (7.5YR 4/3); orange staining		
125	60	No Sieve Samples Collected					(127'); moist	(127.0 - 132.0') Soft drilling, recovered lost 5 feet of sample from drilling run (117' to 127')	
126							(128.0 - 144.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); light olive brown (2.5Y 5/6); granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subangular; little silt; little clay; trace cobbles; gravel lens; moist		
127							(131'); to 131.5' cobbles		
128							(132') brown (7.5YR 4/2)		
129	90			Topock - Alluvium Deposits	GM		(133.5'); dry; with potential caliche in sediments and weak cementation	(132.0 - 142.0') Rough drilling	
130									
131									
132									
133									
134									
135									
136									
137									
138									
139									
140									






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Date Started:	03/20/2019	Surface Elevation:	N/A	Boring No.: MW-Md	
Date Completed:	04/30/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	216 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Borat Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	44.85 ft bgs		
Drilling Asst:	C. Winland/J. Candelaria	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	C. Bonessi/R. Moniz/D. Maurer	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	90			Topock - Alluvium Deposits	GM			(132.0 - 142.0') Rough drilling	(37.0 - 205.0') No used
142									
143									
144				Topock - Alluvium Deposits	ML		(144.0 - 144.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 5/3); low plasticity; some very fine to medium grained sand, angular to subangular; trace granules to very large pebbles, angular to subround; wet, liquefied		
145									
146									
147	120						(144.5 - 154.4') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/2) and brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; some silt; trace cobbles, angular to subangular; trace clay; moist to wet; occasional gravelly and silty lenses 2in to 6in thick		
148									
149			MW-M-VAS-147-152 (<0.17 U ppb) 3/31/2019 15:21	Topock - Alluvium Deposits	SM				
150									
151									
152									
153								(152.0 - 167.0') Soft drilling	
154									
155									
156	180						(154.4 - 166.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/2) and brown (7.5YR 4/3); granules to very large pebbles, angular to subround; some very fine to medium grained sand, angular to subround; some silt; little cobbles, angular to subangular; moist to wet; iron oxide staining; occasional sand lenes 2in to 6in thick		
157				Topock - Alluvium Deposits	GM		(157'); dry; with red and green staining		
158							(158'); moist		
159									
160									





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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	180	No Sieve Samples Collected		Topock - Alluvium Deposits	GM		(164'); moist to dry	(152.0 - 167.0') Soft drilling	(37.0 - 205.0') No used
162									
163									
164									
165									
166			Topock - Alluvium Deposits	SM		(166.5 - 170.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 4/3); very fine grained to medium grained, angular to subround; some silt; little granules to very large pebbles, angular to subround; trace cobbles, angular to subangular; trace clay; wet	(167.0 - 177.0') Soft drilling		
167									
168									
169									
170									
171	120			Topock - Alluvium Deposits	GM		(170.0 - 176.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3) with brown (7.5YR 5/2); granules to very large pebbles, angular to subround; some cobbles, angular to subangular; little very fine to medium grained sand, angular to subangular; little silt; moist		
172									
173									
174									
175									
176		MW-M-VAS- 172-177 (<0.033 U ppb) 4/2/2019 14:57	Topock - Alluvium Deposits	GM		(172'); dry; to 176.5', with red and green staining, potential caliche in sediments and weak cementation			
177									
178									
179									
180									
177	180			Topock - Alluvium Deposits	GM		(176.5 - 192.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to small pebbles, angular to subangular; some very fine to very coarse grained sand; little medium to very large pebbles, angular to subangular; little cobbles; little silt; trace clay; wet to moist; interbedded GW and GM with occasional well graded sand with gravel lenses 2in to 6 in thick	(177.0 - 192.0') Soft drilling	
178									
179									
180									




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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	180	No Sieve Samples Collected		Topock - Alluvium Deposits	GM			(177.0 - 192.0') Soft drilling	(37.0 - 205.0') No used
182									
183									
184									
185									
186									
187	120		MW-M-VAS-190-195 (<0.17 U ppb) 4/10/2019 16:35		Topock - Alluvium Deposits	GM		(192.0 - 195.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace reddish brown (2.5YR 4/4); granules to large pebbles, angular to subround; some very fine to very coarse grained sand, angular to subround; little silt; little clay; trace cobbles; wet; weak cementation	(192.0') Change in geologist to CB
188									
189									
190									
191									
192									
193	120	MW-M-VAS-190-195 (<0.17 U ppb) 4/10/2019 16:35		Topock - Alluvium Deposits	SM		(195.0 - 196.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subround; trace clay; wet	(196.0 - 203.0') Rough drilling	
194									
195				Topock - Alluvium Deposits	GM		(196.0 - 205.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace reddish brown (2.5YR 4/4); granules to large pebbles, angular to subround; some very fine to very coarse grained sand, angular to subround; little silt; little clay; trace cobbles; wet; weak cementation		
196									
197									
198									
199									
200									

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Date Started: 03/20/2019	Surface Elevation: N/A	Boring No.: MW-Md
Date Completed: 04/30/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 216 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.85 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: C. Bonessi/R. Moniz/D. Maurer	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
201	120			Topock - Alluvium Deposits	GM			(196.0 - 203.0') Rough drilling	(37.0 - 205.0') No used
202									
203									
204									
205									
206	72	No Sieve Samples Collected		Topock - Bedrock - metadiorite	GM		(205.0 - 208.0') Topock - Bedrock - metadiorite; Silty gravel with sand (GM); grayish brown (2.5Y 5/2) with greenish gray(10Y 6/1); granules to large pebbles, angular to subround; some very fine to very coarse grained sand, angular to subround; some silt; little clay; moist; moderate cementation; weathered metadiorite	(205.0 - 211.0') Very tight drilling, locked up core barrel at 208'	(205.0 - 211.0') 600 gallons of water used; 600 gallons of water recovered; 0 gallons of water lost
207									
208									
209									
210									
211	48			Topock - Bedrock - metadiorite			(208.0 - 216.0') Topock - Bedrock - metadiorite; grayish brown (2.5Y 5/2) with greenish gray(10Y 6/1); granules to large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; some silt; little clay; dry; moderate cementation; bedrock pulverized during drilling	(211.0 - 216.0') Rough drilling, hard, rods and head chattering	(211.0 - 216.0') No used
212									
213									
214									
215									
216	End of Boring at 216.0' bgs.								
217									
218									
219									
220									

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Date Started: 05/13/2019	Surface Elevation: N/A	Boring No.: MW-Ms
Date Completed: 05/28/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 99 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.23 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 8 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: Michael Andrews	Sampling Interval: Screen Interval	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1					NR		(0.0 - 3.0') (NR); Hand cleared for utility clearance, could not hand clear past 3 ft. bgs recieved approval to start drilling, not logged, no recovery		(0.0 - 6.0') No water used
2									
3							(3.0 - 37.0') (NR); Core not collected or logged, no recovery, see boring log MW-Md for lithology		
4									
5									
6								(6.0 - 13.0') Rough drilling	(6.0 - 7.0') 5 gallons of water used; 5 gallons of water recovered; 0 gallons of water lost
7									
8									(7.0 - 99.0') No water used
9									
10		No Sieve Samples Collected							
11					NR				
12									
13									
14									
15									
16									
17									
18								(18.0 - 19.0') Drill rods chattering	
19								(19.0 - 20.0') Rough drilling, drill rods	
20									


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Date Started: 05/13/2019	Surface Elevation: N/A	Boring No.: MW-Ms
Date Completed: 05/28/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 99 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.23 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 8 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: Michael Andrews	Sampling Interval: Screen Interval	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21								chattering (20.0 - 27.0') Casing getting stuck, voids forming, rough drilling and drill rods chattering (20' to 26')	(7.0 - 99.0') No water used
22									
23									
24									
25									
26									
27									
28									
29					NR				
30		No Sieve Samples Collected							
31									
32									
33									
34								(33.0 - 38.0') Drill rods chattering	
35									
36									
37									
38	108			Topock - Alluvium Deposits	SM		(37.0 - 42.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); (7.5R 4/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; little silt; trace clay; dry to moist		
39									
40									

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Date Started: <u>05/13/2019</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>MW-Ms</u>
Date Completed: <u>05/28/2019</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>99 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Borat Longyear Track Mount</u>	Borehole Diameter: <u>10-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Driller Name: <u>Tyler Alymer</u>	Depth to First Water: <u>44.23 ft bgs</u>	
Drilling Asst: <u>C. Winland/J. Candelaria</u>	Sampling Method: <u>8 inch x 10 ft. Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Michael Andrews</u>	Sampling Interval: <u>Screen Interval</u>	
Editor: <u>Sean McGrane</u>	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	108			Topock - Alluvium Deposits	SM				(7.0 - 99.0') No water used
42									
43				Topock - Alluvium Deposits	SC		(42.5 - 44.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (10YR 4/3); fine grained to very coarse grained, angular to subround; some granules to large pebbles, angular to subangular; little clay; trace silt; dry to moist		
44									
45	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(44.0 - 46.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 4/3); very fine grained to very coarse grained, angular to subround; little granules to large pebbles, angular; little silt; trace clay; trace mica; wet	<div style="text-align: center;">  </div>	(47.0 - 52.0') Rough drilling
46							(46.0 - 47.0'); No recovery		
47									
48				Topock - Alluvium Deposits	SC		(47.0 - 49.5') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (10YR 4/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; some cobbles, angular to subangular; little silt; little clay; wet		
49									
50				Topock - Alluvium Deposits	SM		(49.5 - 52.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 4/3); fine grained to coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace clay; wet		
51									
52									
53				Topock - Alluvium Deposits	GM		(52.0 - 53.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); dark grayish brown / dark yellowish brown (10YR 4/2); granules to very large pebbles, angular to subangular; little fine to very coarse grained sand, angular to subround; little silt; trace cobbles, angular to subangular; trace boulders; trace clay; wet		
54									
55				Topock - Alluvium Deposits	SM		(53.0 - 57.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to very coarse grained, subround; some small to large pebbles, angular to subangular; some silt; trace clay; trace mica; wet to moist		
56									
57									
58									
59									
60									
							(57.0 - 67.0') (NR); Core not collected or logged, no recovery, see boring log MW-Md for lithology		

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Date Started:	05/13/2019	Surface Elevation:	N/A	Boring No.: MW-Ms	
Date Completed:	05/28/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	99 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Borat Longyear Track Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	44.23 ft bgs		
Drilling Asst:	C. Winland/J. Candelaria	Sampling Method:	8 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Michael Andrews	Sampling Interval:	Screen Interval		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61									(7.0 - 99.0') No water used
62									
63									
64									
65									
66									
67									
68				Topock - Alluvium Deposits	GM		(67.0 - 68.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); (7.5R 4/4); granules to very large pebbles, angular to subround; some fine to very coarse grained sand, angular to subround; little silt; trace clay; wet	(67.0 - 77.0') Rough drilling	
69							(68.0 - 72.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 4/3); medium grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subangular; trace cobbles, angular to subangular; trace clay; wet		
70				Topock - Alluvium Deposits	SM		(69.5') some small to very large pebbles, angular to subangular; trace cobbles, angular to subangular; trace mica		
71									
72	120								
73							(72.0 - 76.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown (5YR 4/4); granules to very large pebbles, angular to subangular; some fine to very coarse grained sand, angular to subangular; little silt; trace cobbles, angular to subangular; trace clay; wet		
74			MW-M-VAS-72-77 (<0.033 U ppb) 3/29/2019 14:01	Topock - Alluvium Deposits	GM				
75									
76									
77							(76.0 - 83.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); dark yellowish brown (10YR 4/4); granules to very large pebbles, angular to subangular; some fine to very coarse grained sand, angular to subround; little silt; trace cobbles, angular; wet		
78	120			Topock - Alluvium Deposits	GM				
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured during first VAS interval MW-Md

Date Started: 05/13/2019	Surface Elevation: N/A	Boring No.: MW-Ms
Date Completed: 05/28/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 99 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Borat Longyear Track Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Tyler Alymer	Depth to First Water: 44.23 ft bgs	
Drilling Asst: C. Winland/J. Candelaria	Sampling Method: 8 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: Michael Andrews	Sampling Interval: Screen Interval	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	120	No Sieve Samples Collected		Topock - Alluvium Deposits	GM		(81'); decrease in cobbles	(87.0 - 97.0') Rough drilling	(7.0 - 99.0') No water used
82				Topock - Alluvium Deposits	ML		(83.5 - 85.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 4/3); low plasticity; some very fine to very coarse grained sand, angular to subangular; little granules to medium pebbles, angular; wet		
83				Topock - Alluvium Deposits	SM		(85.0 - 88.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 4/3); very fine grained to very coarse grained, angular to subround; little granules to large pebbles, angular to subangular; little silt; wet		
84	Topock - Alluvium Deposits			SC		(88.5 - 90.5') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (10YR 4/3); medium grained to very coarse grained, angular to subround; little small to very large pebbles, angular to subangular; little silt; little clay; trace cobbles, angular; moist to dry			
85	120			Topock - Alluvium Deposits	SW-SM		(90.5 - 97.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark yellowish brown (10YR 4/4); medium grained to very coarse grained, angular to round; some granules to large pebbles, angular to subangular; little silt; wet		
86					NR		(97.0 - 99.0') (NR); Core not collected or logged, no recovery, see boring log MW-Md for lithology		
87		End of Boring at 99.0 'bgs.							
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = No Recovery, blue water table symbol represents depth to water measured during first VAS interval MW-Md

Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1					(0.0 - 1.4') Concrete Pad (0.5 - 89.0') 2" PVC Sch 80 Casing (0.6 - 119.0') 2" PVC Sch 80 Casing		(0.0 - 1.4') 6.5 bags Note: 2.5 x 2.5 ft concrete pad with 18 diameter lockable vault, King Kon-Crete 4000 PSI
2							
3					(1.4 - 4.0') Bentonite seal chips	(1.4 - 4.0') 2.68 bags	(1.4 - 4.0') 7 bags (161%) Note: Puregold Medium Chips, used to fill void from approximately 2 to 4 ft bgs
4							
5							
6							
7							
8							
9							
10			NR				Note: During development an obstruction was observed at ~8 ft. bgs, a bulge in the casing was observed with a downhole camera, the casing does not appear to be compromised
11							
12					(4.0 - 75.0') Portland Cement 6% Bentonite	(4.0 - 75.0') 286.1 gallons	(4.0 - 75.0') 480 gallons (68%) Note: Used Type I, II, and V and Hydrogel
13							
14							
15							
16							
17							
18							
19							
20					(15.0 - 143.0') 10.0" Borehole		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21					(0.5 - 89.0') 2" PVC Sch 80 Casing		
22							
23							
24							
25							
26							
27							
28							
29							
30			NR		(4.0 - 75.0') Portland Cement 6% Bentonite	(4.0 - 75.0') 286.1 gallons	(4.0 - 75.0') 480 gallons (68%) Note: Used Type I, II, and V and Hydrogel
31					(29.5 - 30.5') Centralizer		
32							
33							
34							
35							
36							
37							
38							
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41					(0.5 - 89.0') 2" PVC Sch 80 Casing		
42							
43							
44							
45							
46							
47							
48							
49							
50			NR		(4.0 - 75.0') Portland Cement 6% Bentonite	(4.0 - 75.0') 286.1 gallons	(4.0 - 75.0') 480 gallons (68%) Note: Used Type I, II, and V and Hydrogel
51							
52							
53							
54							
55							
56							
57							
58							
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started: 06/16/2019	Surface Elevation: N/A	Well ID: MW-R-109, MW-R-139
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: Eddie Ramos	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 10-12 inches	
Logger: G. Jeffers / A. Mack	Water Level Start: 90.27 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/13/2019	
Total Depth: 143 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61					(0.5 - 89.0') 2" PVC Sch 80 Casing		
62							
63							
64							
65							
66							
67							
68					(4.0 - 75.0') Portland Cement 6% Bentonite	(4.0 - 75.0') 286.1 gallons	(4.0 - 75.0') 480 gallons (68%) Note: Used Type I, II, and V and Hydrogel
69							
70			NR		(69.5 - 70.5') Centralizer		
71							
72							
73							
74							
75							
76							
77							
78					(75.0 - 85.0') Bentonite seal chips	(75.0 - 85.0') 6.97 bags	(75.0 - 85.0') 8 bags (15%) Note: Puregold Medium Chips
79							
80							

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Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81					(0.5 - 89.0') 2" PVC Sch 80 Casing		
82							
83					(75.0 - 85.0') Bentonite seal chips	(75.0 - 85.0') 6.97 bags	(75.0 - 85.0') 8 bags (15%) Note: Puregold Medium Chips
84			NR				
85							
86							
87							
88		Topock - Alluvium Deposits	SW-SM				
89					(89.0 - 109.0') 2" Sch 80 PVC (20-slot) Screen		
90							
91							
92		Topock - Alluvium Deposits	GM		(15.0 - 143.0') 10.0" Borehole		
93					(85.0 - 113.0') Cemex #3 MESH (8x10)	(85.0 - 113.0') 27.2 bags	(85.0 - 113.0') 34 bags (25%) Note: Lapis Lustre Sand
94	MW-R-VAS-92-97 (45 ppb) 5/13/2019 11:44						
95							
96							
97		Topock - Alluvium Deposits	SM				
98							
99		Topock - Alluvium Deposits	SW-SM				
100							

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Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
101			SW-SM		(89.0 - 109.0') 2" Sch 80 PVC (20-slot) Screen		
102		Topock - Alluvium Deposits	SM				
103							
104							
105			NR				
106							
107					(85.0 - 113.0') Cemex #3 MESH (8x10)	(85.0 - 113.0') 27.2 bags	(85.0 - 113.0') 34 bags (25%) Note: Lapis Lustre Sand
108							
109		Topock - Alluvium Deposits	SM				
110					(109.5 - 110.5') Centralizer		
111					(109.0 - 111.3') Sump and End Cap		
112							
113							
114			NR				
115					(113.0 - 117.0') Bentonite seal pellets	(113.0 - 117.0') 3.3 buckets	(113.0 - 117.0') 4 buckets (21%) Note: Pel-Plug (TR30) 3/8"
116							
117							
118	MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14		NR		(117.0 - 143.0') Cemex #3 MESH (8x10)	(117.0 - 143.0') 27.3 bags	(117.0 - 143.0') 34 bags (25%) Note: Lapis Lustre Sand
119		Topock - Alluvium Deposits	SM				
120					(119.0 - 139.0') 2" Sch 80 PVC (20-slot) Screen		


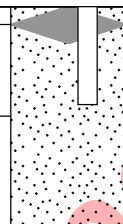
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started: 06/16/2019	Surface Elevation: N/A	Well ID: MW-R-109, MW-R-139
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: Eddie Ramos	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 10-12 inches	
Logger: G. Jeffers / A. Mack	Water Level Start: 90.27 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/13/2019	
Total Depth: 143 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
121	MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14	Topock - Alluvium Deposits	SM		(119.0 - 139.0') 2" Sch 80 PVC (20-slot) Screen		
122		Topock - Alluvium Deposits	GW-GM				
123		Topock - Alluvium Deposits	GW-GM				
124		Topock - Alluvium Deposits	GW-GM				
125		Topock - Alluvium Deposits	GW-GM				
126		Topock - Alluvium Deposits	GW-GM				
127		Topock - Alluvium Deposits	GW-GM				
128		Topock - Alluvium Deposits	GW-GM				
129		Topock - Alluvium Deposits	GM		(117.0 - 143.0') Cemex #3 MESH (8x10)		
130		Topock - Alluvium Deposits	GM		(15.0 - 143.0') 10.0" Borehole	(117.0 - 143.0') 27.3 bags	(117.0 - 143.0') 34 bags (25%) Note: Lapis Lustre Sand
131		Topock - Alluvium Deposits	GM				
132		Topock - Alluvium Deposits	GM				
133		Topock - Alluvium Deposits	GW-GM				
134		Topock - Alluvium Deposits	GW-GM				
135		Topock - Alluvium Deposits	GW-GM				
136		Topock - Alluvium Deposits	GW-GM				
137		Topock - Alluvium Deposits	GW-GM				
138		Topock - Alluvium Deposits	SM				
139		Topock - Alluvium Deposits	SM				
140		Topock - Alluvium Deposits	SW-SM		(139.5 - 140.5') Centralizer		

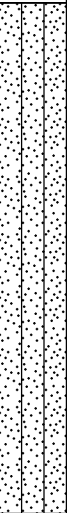

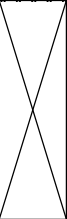
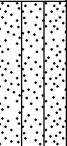

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	06/16/2019	Surface Elevation:	N/A	Well ID: MW-R-109, MW-R-139
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Eddie Ramos	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	10-12 inches	
Logger:	G. Jeffers / A. Mack	Water Level Start:	90.27 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/13/2019	
Total Depth:	143 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed
141		Topock - Alluvium Deposits	SW-SM		(139.5 - 140.5') Centralizer		(15.0 - 143.0') 10.0" Borehole	(117.0 - 143.0') 27.3 bags	(117.0 - 143.0') 34 bags (25%) Note: Lapis Lustre Sand
142	(117.0 - 143.0') Cemex #3 MESH (8x10)				(139.0 - 141.4') Sump and End Cap				
143									
144					End of Boring at 143.0' bgs.				
145									
146									
147									
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed			
1		Topock - Alluvium Deposits	SM		(0.0 - 1.5') Concrete Pad (0.5 - 172.0') 2" PVC Sch 80 Casing (0.6 - 255.0') 277" PVC Sch 80 Casing		(0.0 - 1.5') 7 bags Note: 2.5 x 2.5 ft concrete pad with 18 diameter lockable vault, King Kon-Crete 4000 PSI			
2										
3										
4										
5										
6		Topock - Alluvium Deposits	SW-SM		(1.5 - 10.0') Bentonite Chips	(1.5 - 10.0') 8.75 bags	(1.5 - 10.0') 19 bags (117%) Note: Puregold Medium Chips, used to fill 24 to 36 inch void from ~5 to 10 ft bgs			
7										
8								(0.0 - 15.0') 12.0" Borehole		
9										
10										
11		Topock - Alluvium Deposits	NR		(10.0 - 66.8') Portland Cement 6% Bentonite	(10.0 - 66.8') 221.8 gallons	Note: During installation of the first lift of high solids grout a 10 ft section of tremie pipe became unthreaded, during attempts to retrieve the pipe, the pipe fell to ~20 ft. bgs and was grouted in place in with the Portland Cement 6% Bentonite grout (10.0 - 66.8') 320 gallons (44%) Note: Type I, II, and V and Benseal			
12										
13										
14										
15										
16		Topock - Alluvium Deposits	SM							
17										
18										
19		Topock - Alluvium Deposits	SW-SM		(15.0 - 279.0') 10.0" Borehole					
20										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 05/11/2019	Surface Elevation: N/A	Well ID: MW-R-192, MW-R-275
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / D. O'Mara	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 4-12 inches	
Logger: G. Jeffers / C. Stewart	Water Level Start: 90.59 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/9/2019	
Total Depth: 287 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21		Topock - Alluvium Deposits	SW-SM		(0.5 - 172.0') 2" PVC Sch 80 Casing		
22		Topock - Alluvium Deposits	SM				
23							
24							
25							
26					(25.5 - 26.5') Centralizer		
27							
28		Topock - Alluvium Deposits	SW-SM				
29							
30					(10.0 - 66.8') Portland Cement 6% Bentonite	(10.0 - 66.8') 221.8 gallons	(10.0 - 66.8') 320 gallons (44%) Note: Type I, II, and V and Benseal
31							
32							
33							
34		Topock - Alluvium Deposits	SW				
35							
36			NR				
37							
38		Topock - Alluvium Deposits	SM				
39							
40							

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Well Construction Log

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41		Topock - Alluvium Deposits	SM		(0.5 - 172.0') 2" PVC Sch 80 Casing		
42							
43							
44		Topock - Alluvium Deposits	SW-SM				
45							
46							
47							
48			NR				
49							
50					(10.0 - 66.8') Portland Cement 6% Bentonite	(10.0 - 66.8') 221.8 gallons	(10.0 - 66.8') 320 gallons (44%) Note: Type I, II, and V and Benseal
51		Topock - Alluvium Deposits	SW-SM		(15.0 - 279.0') 10.0" Borehole		
52							
53							
54							
55							
56							
57							
58			NR				
59							
60							





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Date Started: 05/11/2019	Surface Elevation: N/A	Well ID: MW-R-192, MW-R-275
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / D. O'Mara	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 4-12 inches	
Logger: G. Jeffers / C. Stewart	Water Level Start: 90.59 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/9/2019	
Total Depth: 287 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61		Topock - Alluvium Deposits	SW-SM		(0.5 - 172.0') 2" PVC Sch 80 Casing		
62							
63		Topock - Alluvium Deposits	SM		(10.0 - 66.8') Portland Cement 6% Bentonite	(10.0 - 66.8') 221.8 gallons	(10.0 - 66.8') 320 gallons (44%) Note: Type I, II, and V and Benseal
64							
65		Topock - Alluvium Deposits	SW		(65.5 - 66.5') Centralizer		
66							
67							
68							
69		Topock - Alluvium Deposits	SM		(66.8 - 71.0') Bentonite seal chips	(66.8 - 71.0') 2.96 bags	(66.8 - 71.0') 5.5 bags (86%) Note: Enviroplug Medium Chips, chips partially settled into high solids grout
70					(15.0 - 279.0') 10.0" Borehole		
71							
72							
73							
74							
75							
76		Topock - Alluvium Deposits	SW-SM		(71.0 - 149.7') High Solids Grout	(71.0 - 149.7') 295.2 gallons	(71.0 - 149.7') 320 gallons (8%) Note: Baroid Industrial Drilling Products - Aquaguard Bentonite Grout
77							
78							
79							
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 05/11/2019	Surface Elevation: N/A	Well ID: MW-R-192, MW-R-275
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / D. O'Mara	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 4-12 inches	
Logger: G. Jeffers / C. Stewart	Water Level Start: 90.59 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/9/2019	
Total Depth: 287 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed
81		Topock - Alluvium Deposits	SW-SM		(0.5 - 172.0') 2" PVC Sch 80 Casing		(0.6 - 255.0') 277" PVC Sch 80 Casing		Note: 1/2 Bag of Bentonite Chips and 1/2 bag of #3 Cemex Sand installed in annulus to find depth to high solids grout
82									
83									
84									
85									
86	MW-R-VAS-92-97 (45 ppb) 5/13/2019 11:44	Topock - Alluvium Deposits	SM		(71.0 - 149.7') High Solids Grout		(15.0 - 279.0') 10.0" Borehole	(71.0 - 149.7') 295.2 gallons	(71.0 - 149.7') 320 gallons (8%) Note: Baroid Industrial Drilling Products - Aquaguard Bentonite Grout
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									

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Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
101					(0.5 - 172.0') 2" PVC Sch 80 Casing		
102							
103							
104							
105							
106					(105.5 - 106.5') Centralizer		Note: 1 Bag of Bentonite Chips and 1/2 bag of #3 Cemex Sand installed in annulus to find depth to high solids grout
107							
108							
109		Topock - Alluvium Deposits	SM				
110					(71.0 - 149.7') High Solids Grout	(71.0 - 149.7') 295.2 gallons	(71.0 - 149.7') 320 gallons (8%) Note: Baroid Industrial Drilling Products - Aquaguard Bentonite Grout
111							
112							
113							
114							
115							
116							
117							
118	MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14	Topock - Alluvium Deposits	GM				
119							
120							

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Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed	
121	MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14	Topock - Alluvium Deposits	GM		(0.5 - 172.0') 2" PVC Sch 80 Casing			(0.6 - 255.0') 277" PVC Sch 80 Casing		
122										
123										
124										
125										
126		Topock - Alluvium Deposits	SM		(71.0 - 149.7') High Solids Grout		(15.0 - 279.0') 10.0" Borehole	(71.0 - 149.7') 295.2 gallons	(71.0 - 149.7') 320 gallons (8%) Note: Baroid Industrial Drilling Products - Aquaguard Bentonite Grout	
127										
128		Topock - Alluvium Deposits	GM							
129										
130										
131										
132										
133		Topock - Alluvium Deposits	ML							
134										
135		Topock - Alluvium Deposits	SM							
136										
137										
138		Topock - Alluvium Deposits	SM							
139										
140										



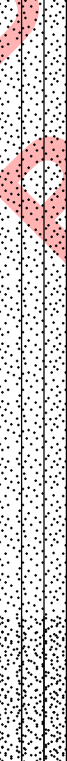


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Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
141					(0.5 - 172.0') 2" PVC Sch 80 Casing		
142							
143							
144							
145					(71.0 - 149.7') High Solids Grout	(71.0 - 149.7') 295.2 gallons	(71.0 - 149.7') 320 gallons (8%) Note: Baroid Industrial Drilling Products - Aquaguard Bentonite Grout
146		Topock - Alluvium Deposits	SM				
147							
148					(147.5 - 148.5') Centralizer		
149							
150							
151					(15.0 - 279.0') 10.0" Borehole		
152							
153	MW-R-VAS-151-156 (<0.033 U ppb) 5/15/2019 10:20						
154		Topock - Alluvium Deposits	GM		(149.7 - 170.0') Bentonite seal pellets	(149.7 - 170.0') 18.5 buckets	(149.7 - 170.0') 15 buckets (-19%) Note: Pel-Plug (TR30) 3/8"
155							
156							
157		Topock - Alluvium Deposits	GW				
158							
159							
160							

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Date Started: 05/11/2019	Surface Elevation: N/A	Well ID: MW-R-192, MW-R-275
Date Completed: 07/31/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: E. Ramos / D. O'Mara	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya/ O. Flores	Borehole Diameter: 4-12 inches	
Logger: G. Jeffers / C. Stewart	Water Level Start: 90.59 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/9/2019	
Total Depth: 287 ft bgs	Well Completion: <input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed	
161		Topock - Alluvium Deposits	GW		(0.5 - 172.0') 2" PVC Sch 80 Casing		(0.6 - 255.0') 277" PVC Sch 80 Casing		(149.7 - 170.0') 15 buckets (-19%) Note: Pel-Plug (TR30) 3/8"	
162										
163										
164										
165					(149.7 - 170.0') Bentonite seal pellets		(149.7 - 170.0') 18.5 buckets			
166										
167										
168										
169			Topock - Alluvium Deposits	SM				(15.0 - 279.0') 10.0" Borehole		(170.0 - 196.0') 30.75 bags (22%) Note: Lapis Lustre Sand
170										
171										
172										
173	(172.0 - 192.0') 2" Sch 80 PVC (20-slot) Screen									
174										
175	(170.0 - 196.0') Cemex #3 MESH (8x10)		(170.0 - 196.0') 25.2 bags							
176										
177										
178										
179		Topock - Alluvium Deposits	SW-SM							
180										

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Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
181		Topock - Alluvium Deposits	SM		(172.0 - 192.0') 2" Sch 80 PVC (20-slot) Screen		
182							
183		Topock - Alluvium Deposits	ML				
184							
185							
186							
187							
188					(170.0 - 196.0') Cemex #3 MESH (8x10)	(170.0 - 196.0') 25.2 bags	(170.0 - 196.0') 30.75 bags (22%) Note: Lapis Lustre Sand
189							
190					(15.0 - 279.0') 10.0" Borehole		
191							
192		Topock - Alluvium Deposits	SM				
193					(192.5 - 193.5') Centralizer		
194	MW-R-VAS-192-197 (<0.033 U ppb) 5/16/2019 09:55				(192.0 - 194.0') Sump and End Cap		
195							
196							
197							
198					(196.0 - 253.0') Bentonite seal pellets	(196.0 - 253.0') 54.2 buckets	(196.0 - 253.0') 54 buckets (0%) Note: Pel-Plug (TR30) 3/8"
199							
200							

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Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
201					(0.6 - 255.0') 277" PVC Sch 80 Casing		
202							
203							
204							
205							
206							
207							
208							
209							
210		Topock - Alluvium Deposits	SM		(196.0 - 253.0') Bentonite seal pellets (15.0 - 279.0') 10.0" Borehole	(196.0 - 253.0') 54.2 buckets	(196.0 - 253.0') 54 buckets (0%) Note: Pel-Plug (TR30) 3/8"
211							
212							
213							
214							
215							
216							
217							
218							
219							
220							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
221					(0.6 - 255.0') 277" PVC Sch 80 Casing		
222							
223							
224							
225							
226							
227							
228							
229	MW-R-VAS-227-232 (<0.033 U ppb) 5/17/2019 10:05	Topock - Alluvium Deposits	SM		(196.0 - 253.0') Bentonite seal pellets	(15.0 - 279.0') 10.0" Borehole	(196.0 - 253.0') 54.2 buckets
230							(196.0 - 253.0') 54 buckets (0%) Note: Pel-Plug (TR30) 3/8"
231							
232							
233							
234							
235							
236					(235.5 - 236.5') Centralizer		
237							
238							
239							
240							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
241	MW-R-VAS-255-260 (<0.17 U ppb) 5/29/2019 12:00	Topock - Alluvium Deposits	SM			(0.6 - 255.0') 277" PVC Sch 80 Casing		(196.0 - 253.0') 54 buckets (0%) Note: Pel-Plug (TR30) 3/8"
242								
243								
244								
245								
246		Topock - Alluvium Deposits	GM		(196.0 - 253.0') Bentonite seal pellets	(196.0 - 253.0') 54.2 buckets		
247								
248								
249								
250					(15.0 - 279.0') 10.0" Borehole			
251								
252								
253								
254								
255								(253.0 - 279.0') Cemex #3 MESH (8x10)
256								
257								
258								
259								
260		Topock - Alluvium Deposits	SM					

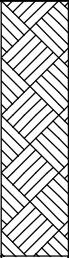
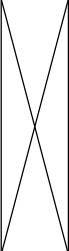
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
261		Topock - Alluvium Deposits	SM		(255.0 - 275.0') 277" Sch 80 PVC (20-slot) Screen		
262							
263							
264							
265							
266							
267							
268		Topock - Weathered Bedrock - conglomerate	SM				
269					(253.0 - 279.0') Cemex #3 MESH (8x10)	(15.0 - 279.0') 10.0" Borehole	(253.0 - 279.0') 27.3 bags
270							(253.0 - 279.0') 36 bags (32%) Note: Lapis Lustre Sand
271	MW-R-VAS-269-274 (<0.17 U ppb) 5/30/2019 14:30						
272							
273							
274							
275							
276		Topock - Competent Bedrock - conglomerate			(275.5 - 276.5') Centralizer	(275.0 - 277.0') Sump and End Cap	
277							
278							
279					(279.0 - 287.0') Bentonite seal chips	(279.0 - 287.0') 6" Borehole	(279.0 - 287.0') 2.18 bags
280							(279.0 - 287.0') 2 bags (-8%) Note: Enviroplug Medium Chips

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	05/11/2019	Surface Elevation:	N/A	Well ID: MW-R-192, MW-R-275
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / D. O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya/ O. Flores	Borehole Diameter:	4-12 inches	
Logger:	G. Jeffers / C. Stewart	Water Level Start:	90.59 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/9/2019	
Total Depth:	287 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
281		Topock - Competent Bedrock - conglomerate			<div><div></div></div>	(279.0 - 287.0') 6" Borehole	(279.0 - 287.0') 2.18 bags	(279.0 - 287.0') 2 bags (-8%) Note: Enviroplug Medium Chips
282								
283								
284					(279.0 - 287.0') Bentonite seal chips			
285			NR					
286								
287								
288					End of Boring at 287.0 'bgs.			
289								
290								
291								
292								
293								
294								
295								
296								
297								
298								
299								
300								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid		
1	60	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(0.0 - 7.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; little granules to very large pebbles, angular to subround; little silt; trace cobbles, angular to subround; dry; coarser clasts compose of granite, basalt and metadiorite	(0.0 - 5.0') Hand augered to 5 feet bgs for utility clearance	(0.0 - 27.0') No water used		
2											
3											
4											
5	24										(3.5 - 5.0') Lost 12" casing down hole
6											
7											
8											
9	84					Topock - Alluvium Deposits	SW-SM			(7.0 - 14.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; little granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; dry	(13.0') 12 inch casing started to fall added 2 more feet of casing and set at 15 ft. bgs
10											
11											
12											
13											
14											
15											
16											
17	120						NR			(14.0 - 17.0') No recovery (NR)	
18											
19											
20											
				Topock - Alluvium Deposits	SM		(17.0 - 19.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; dry; iron oxide staining				
				Topock - Alluvium Deposits	SW-SM		(19.0 - 21.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large				

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	120			Topock - Alluvium Deposits	SW-SM		pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace boulders, subangular; trace mica; coarser clasts composed of metadiorite; dry		(0.0 - 27.0') No water used
22				Topock - Alluvium Deposits	SM		(21.0 - 24.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; dry		
23									
24									
25	60	No Sieve Samples Collected		Topock - Alluvium Deposits	SW-SM		(24.0 - 33.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; dry		(27.0 - 32.0') 10 gallons of water used; 0 gallons of water recovered; 10 gallons of water lost
26									
27									
28									
29	36			Topock - Alluvium Deposits	SW		(28.5'); pulverized boulder	(32.0 - 37.0') Core barrel and sediments in core hot, slow drilling due to tight formation and soils falling out of core during clean out runs	(32.0 - 37.0') 5 gallons of water used; 0 gallons of water recovered; 5 gallons of water lost
30							(29'); and granules to very large pebbles, angular to subangular; decrease in sand		
31									
32							(32'); some granules to very large pebbles, angular to subangular; increase in sand		
33	60			Topock - Alluvium Deposits	SW		(33.0 - 35.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; trace silt; trace mica; coarser clasts composed of metadiorite; dry	(37.0 - 47.0') Slow drilling due to tight formation and soils falling out of core during clean out runs	(37.0 - 42.0') 5 gallons of water used; 0 gallons of water recovered; 5 gallons of water lost
34									
35									
36									
37	60			Topock - Alluvium Deposits	NR		(35.0 - 37.0') No recovery (NR)		
38									
39									
40									

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	60			Topock - Alluvium Deposits	SM			(37.0 - 47.0') Slow drilling due to tight formation and soils falling out of core during clean out runs	(37.0 - 42.0') 5 gallons of water used; 0 gallons of water recovered; 5 gallons of water lost
42							(41.0 - 47.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; dry; trace oxidized staining.		
43									
44				Topock - Alluvium Deposits	SW-SM				
45	60								
46									
47									
48							(47.0 - 50.0') No recovery (NR); core bag broke soils fell into hopper	(47.0 - 52.0') Drill rods chattering, slow drilling due to tight formation and soils falling out of core during clean out runs	
49					NR				
50									
51	48						(50.0 - 57.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subangular; little granules to very large pebbles, angular to subangular; little silt; trace clay; trace mica; coarser clasts composed of metadiorite; dry		
52									
53				Topock - Alluvium Deposits	SW-SM			(52.0 - 54.0') Slow drilling due to tight formation and soils falling out of core during clean out runs	
54									
55							(54.0 - 57.0'); some granules to very large pebbles, angular to subangular; decrease in sand, no clay	(54.0 - 72.0') Drill rods chattering, slow drilling due to tight formation and soils falling out of core during clean out runs	
56	36								
57									
58							(57.0 - 60.0') No recovery (NR)	(57.0 - 60.0') Core bag broke, core lost in hopper	
59	24				NR				
60									

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	24			Topock - Alluvium Deposits	SW-SM		(60.0 - 62.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (10YR 4/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; dry	(54.0 - 72.0') Drill rods chattering, slow drilling due to tight formation and soils falling out of core during clean out runs	(42.0 - 270.0') No water used
62				Topock - Alluvium Deposits	SM		(62.0 - 64.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subangular; trace clay; trace mica; coarser clasts composed of metadiorite; dry		
63				Topock - Alluvium Deposits	SW		(64.5 - 66.5') Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (10YR 5/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; trace silt; trace clay; trace mica; dry; larger clasts consist of metadiorite and conglomerate		
64				Topock - Alluvium Deposits	SM		(66.5 - 72.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3) little brown (10YR 4/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace mica; dry; larger clasts consist of metadiorite and conglomerate		
65	120			Topock - Alluvium Deposits	SM				
66									
67									
68									
69									
70									
71									
72									
73									
74									
75	60								
76									
77									
78									
79	108								
80									

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Date Started:	05/11/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Rd</u>	
Date Completed:	06/04/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	287 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / D. O'Mara	Depth to First Water:	90.59 ft bgs		
Drilling Asst:	L. Amaya/ O. Flores	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	G. Jeffers / C. Stewart	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	108			Topock - Alluvium Deposits	SW-SM			(72.0 - 92.0') Slow drilling due to tight formation and soils falling out of core during clean out runs	(42.0 - 270.0') No water used
82									
83									
84									
85	72	No Sieve Samples Collected					(86.0 - 117.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace clay; trace mica; dry; larger clasts consist of metadiorite and conglomerate (87'); decrease in silt, increase in sand		
86									
87									
88									
89	60						(91'); moist; weak cementation		
90									
91									
92									
93	120			Topock - Alluvium Deposits	SM		(92'); some silt; little small to very large pebbles, angular to subangular; wet; no clay, no cementation	(92.0') Approximate depth to water	
94									
95									
96									
97							(94.5'); some small to very large pebbles, angular to subangular; trace clay; weak cementation; increase in silt, decrease in sand		
98									
99									
100									

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101									(42.0 - 270.0') No water used
102									
103									
104	120								
105									
106									
107									
108									
109				Topock - Alluvium Deposits	SM				
110		No Sieve Samples Collected							
111									
112	120						(112'); pulverized weathered metadiorite boulder fragments		
113							(112.5') brown (10YR 5/3) trace reddish brown (2.5YR 5/4); some granules to very large pebbles, angular to subangular; decrease silt, no cementation, trace mottling		
114									
115									
116							(116'); decrease silt, increase granules and pebbles	(115.0 - 122.0') Soft drilling	
117									
118	60		MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14	Topock - Alluvium Deposits	GM		(117.0 - 128.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (10YR 5/3) little reddish brown (2.5YR 5/4); granules to small cobbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; little silt; trace mica; coarser clasts composed of metadiorite; wet; silt nodules		
119									
120									

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	60		MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14					(115.0 - 122.0') Soft drilling	(42.0 - 270.0') No water used
122									
123									
124									
125	60			Topock - Alluvium Deposits	GM		(125'); and very fine to very coarse grained sand, angular to subangular; decrease in granules to cobbles		
126									
127									
128									
129				Topock - Alluvium Deposits	SM		(128.5 - 130.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3) trace reddish brown (2.5YR 5/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace mica; coarser clasts composed of metadiorite; wet		
130									
131									
132	120			Topock - Alluvium Deposits	GM		(130.5 - 137.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (10YR 5/3) trace reddish brown (2.5YR 5/4); granules to small cobbles, angular to subangular; and very fine to very coarse grained sand, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; silt nodules		
133									
134									
135									
136									
137									
138	120			Topock - Alluvium Deposits	ML		(137.5 - 138.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (10YR 5/3); medium plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; trace mica; coarser clasts composed of metadiorite; wet; soft to medium stiff		
139				Topock - Alluvium Deposits	SM		(138.5 - 153.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3) trace reddish brown (2.5YR 5/4); very fine grained to very coarse grained, angular to subangular; some granules		
140									




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Date Started:	05/11/2019	Surface Elevation:	N/A	Boring No.: MW-Rd	
Date Completed:	06/04/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	287 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / D. O'Mara	Depth to First Water:	90.59 ft bgs		
Drilling Asst:	L. Amaya/ O. Flores	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	G. Jeffers / C. Stewart	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141							to very large pebbles, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; interbedded silt and granule to pebble lenses		(42.0 - 270.0') No water used
142							(141'); some silt; decrease in sand, increase in granules and pebbles		
143							(142.5'); little silt; increase in sand, increase in granules and pebbles		
144	120								
145									
146									
147				Topock - Alluvium Deposits	SM				
148									
149							(149'); some silt; decrease in sand		
150		No Sieve Samples Collected							
151									
152	120							(151.0 - 156.0') Cave in prevented sampler from being set at 152 to 157 ft. bgs	
153		MW-R-VAS-151-156 (<0.033 U ppb) 5/15/2019 10:20		Topock - Alluvium Deposits	GM		(153.0 - 157.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (10YR 5/3) little reddish brown (5YR 5/4); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; interbedded silt and sand lenses, trace reddish brown (2.5YR 5/4)		
154									
155									
156									
157									
158	120			Topock - Alluvium Deposits	GW		(157.0 - 168.5') Topock - Alluvium Deposits; Well graded gravel with sand (GW); brown (10YR 4/3); granules to very large pebbles, angular to subangular; and very fine to very coarse grained sand, angular to subangular; trace silt; trace mica; coarser clasts composed of metadiorite; wet; silt nodules	(157.0 - 167.0') Soft drilling	
159									
160									

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Date Started:	05/11/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Rd</u>	
Date Completed:	06/04/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	287 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / D. O'Mara	Depth to First Water:	90.59 ft bgs		
Drilling Asst:	L. Amaya/ O. Flores	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	G. Jeffers / C. Stewart	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	120			Topock - Alluvium Deposits	GW			(157.0 - 167.0') Soft drilling	(42.0 - 270.0') No water used
162									
163									
164									
165	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(168.5 - 179.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; interbedded silt and granule to pebble lenses (170'); some silt; trace cobbles, angular to subangular; increase in granules and pebbles, decrease in sand		
166							(173'); pulverized boulder fragments		
167							(174'); increase in silt, decrease in sand		
168									
169	120			Topock - Alluvium Deposits	SW-SM		(177.0 - 179.0') dark yellowish brown (10YR 4/4) some brown (7.5YR 4/3); trace clay; mottled; iron oxide staining; decrease in granules and pebbles, no cobbles		
170							(179.0 - 180.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); dark yellowish brown (10YR 4/4) some brown (7.5YR 4/3); very fine grained to very coarse grained, angular		
171									
172									
173	120			Topock - Alluvium Deposits					
174									
175									
176									
177	120			Topock - Alluvium Deposits					
178									
179									
180									

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SOIL BORING LOG: PG&E TOPOCK C:\USERS\MCGRANE\DOCUMENTS\PG&E TOPOCK\DRIFT BORING LOGS\GINT FILES\07_29_19\TOPOCK DATA TEMPLATE FOR FLOG.GDT 07/29/19 16:19

Date Started: <u>05/11/2019</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>MW-Rd</u>
Date Completed: <u>06/04/2019</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>287 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Prosonic Truck Mount</u>	Borehole Diameter: <u>4-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Driller Name: <u>E. Ramos / D. O'Mara</u>	Depth to First Water: <u>90.59 ft bgs</u>	
Drilling Asst: <u>L. Amaya/ O. Flores</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>G. Jeffers / C. Stewart</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Sean McGrane</u>	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid																					
181	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		to subangular; some granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; wet; mottled (180.0 - 181.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 4/3) little brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; mottled; interbedded silt and granule to pebble lenses (181.0 - 182.0'); some silt; trace clay; iron oxide staining; decrease in sand		(42.0 - 270.0') No water used																					
182				Topock - Alluvium Deposits	ML		(182.0 - 183.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); brown (7.5YR 4/3); low plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; trace cobbles, subangular; coarser clasts composed of metadiorite; wet; stiff to very stiff; weak cementation; iron oxide staining; trace weathered granules and pebbles (183.0 - 247.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3) some brown (10YR 5/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; wet; laminated; weak cementation; little weathered granules and pebbles, interbedded silt and granule to cobble lenses, mottled, (186'); dry; for 0.5 ft. (187'); decrease in silt, increase in granules and pebbles																							
183																														
184																														
185	60									(188.0 - 207.0') Drill rod broke off during reaming, was retrieved to continue drilling																				
186																														
187																														
188																														
189	60																													
190																														
191																														
192																														
193	60																													
194																														
195																														
196																														
197	120																													
198																														
199																														
200																														

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
201	120						(200'); and silt; decrease in granules to pebbles	(188.0 - 207.0') Drill rod broke off during reaming, was retrieved to continue drilling	(42.0 - 270.0') No water used
202									
203									
204									
205							(205'); some silt; increase in granules and pebbles		
206									
207							(207'); trace clay; decrease in sand	(207.0 - 227.0') Soft drilling (10" casing)	
208									
209									
210		No Sieve Samples Collected		Topock - Alluvium Deposits	SM				
211									
212	120								
213									
214									
215							(215'); some silt; increase in silt, decrease in sand		
216									
217							(217'); decrease in silt, increase in sand, increase in granules and pebbles, no clay, silt nodules		
218									
219	120								
220									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221	120	No Sieve Samples Collected					(225'); little silt; increase in granules and pebbles	(207.0 - 227.0') Soft drilling (10" casing)	(42.0 - 270.0') No water used
222									
223									
224									
225									
226	60		MW-R-VAS-227-232 (<0.033 U ppb) 5/17/2019 10:05	Topock - Alluvium Deposits	SM		(232') brown (7.5YR 4/4) and reddish brown / moderate brown(5YR 4/4); and granules to very large pebbles, angular to subangular; trace cobbles, angular to subangular; decrease in silt, mottled	(227.0 - 232.0') Picked sample location based on lithology (227.0 - 267.0') Soft drilling (10" casing)	
227									
228									
229									
230									
231	180						(233.5'); pulverized boulder fragments within silt matrix, 1 foot thick		
232									
233									
234									
235									
236									
237									
238									
239									
240									
							(239.5'); some granules to very large pebbles, angular to subangular;		

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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
241	180			Topock - Alluvium Deposits	SM		trace cobbles, angular to subangular; increase in silt	(227.0 - 267.0') Soft drilling (10" casing)	(42.0 - 270.0') No water used
242							(241'); and granules to very large pebbles, angular to subangular; trace cobbles, angular to subangular; decrease in silt		
243									
244									
245									
246	120	No Sieve Samples Collected		Topock - Alluvium Deposits	GM		(247.0 - 258.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/4) and reddish brown / moderate brown(5YR 4/4); granules to small cobbles, angular to subangular; and very fine to very coarse grained sand, angular to subangular; little silt; trace mica; coarser clasts composed of metadiorite; wet; mottled; trace weathered granules to cobbles, silt nodules, interbedded silt and sand lenses		
247									
248									
249									
250									
251									
252									
253									
254									
255									
256	120		MW-R-VAS-255-260 (<0.17 U ppb) 5/29/2019 12:00	Topock - Alluvium Deposits	SM		(256'); 1 foot thick very saturated zone		
257									
258									
259									
260							(258.0 - 261.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace cobbles, angular to subangular; trace mica; coarser clasts composed of metadiorite; wet; trace weathered granules and pebbles, interbedded silt and granule to pebble lenses, gradual increase in silt with depth		



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Date Started: 05/11/2019	Surface Elevation: N/A	Boring No.: MW-Rd
Date Completed: 06/04/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 287 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / D. O'Mara	Depth to First Water: 90.59 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / C. Stewart	Sampling Interval: Continuous	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	120			Topock - Alluvium Deposits	SM		(261'); pulverized boulder fragments	(227.0 - 267.0') Soft drilling (10" casing) (247.0 - 274.0') Smooth drilling (10" casing)	(42.0 - 270.0') No water used
262							(261.5 - 274.5') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) trace red / moderate reddish brown(10R 4/6); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace clay; trace mica; coarser clasts composed of metadiorite; wet; weak cementation; interbedded silt and granule to pebble lenses	(247.0 - 274.0') Smooth drilling (10" casing)	
263									
264									
265									
266	120	No Sieve Samples Collected	MW-R-VAS-269-274 (<0.17 U ppb) 5/30/2019 14:30	Topock - Weathered Bedrock - conglomerate	SM		(267'); increase in silt, no clay	(265.0 - 267.0') Tight formation	(270.0 - 279.0') Formation collapse after pulling 10" casing up 10 ft
267									
268								(267.0 - 279.0') Tight and rough drilling (10" casing)	
269							(268.5'); little silt; trace cobbles, angular to subangular; increase in sand, increase in granules to cobbles		
270							(270'); weathered metadiorite		(270.0 - 279.0') 800 gallons of water used; 0 gallons of water recovered; 800 gallons of water lost
271							(271'); increase in sand, increase silt, decrease in granules and pebbles, weathered fractured boulder of metadiorite		
272									
273									
274									
275							(274.5 - 283.5') Topock - Competent Bedrock - conglomerate; reddish brown / moderate brown(5YR 4/4); moist to dry; friable	(274.0 - 279.0') Tight and rough drilling (10" casing)	
276	60			Topock - Competent Bedrock - conglomerate					(277.0 - 282.0') Tight formation
277							(277'); dry		
278									
279									
280									

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Date Started:	<u>05/11/2019</u>	Surface Elevation:	<u>N/A</u>	Boring No.: <u>MW-Rd</u>
Date Completed:	<u>06/04/2019</u>	Northing (NAD83):	<u>N/A</u>	
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>N/A</u>	Client: <u>PG&E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>287 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type:	<u>Prosonic Truck Mount</u>	Borehole Diameter:	<u>4-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Driller Name:	<u>E. Ramos / D. O'Mara</u>	Depth to First Water:	<u>90.59 ft bgs</u>	
Drilling Asst:	<u>L. Amaya/ O. Flores</u>	Sampling Method:	<u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger:	<u>G. Jeffers / C. Stewart</u>	Sampling Interval:	<u>Continuous</u>	
Editor:	<u>Sean McGrane</u>	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
281	60	No Sieve Samples Collected		Topock - Competent Bedrock - conglomerate				(277.0 - 282.0') Tight formation		
282										
283	18							(283.5 - 287.0') No recovery (NR); see drilling notes		(282.0 - 287.0') Rough drilling, core fell out of core barrel downhole
284										
285										
286										
287										
End of Boring at 287.0' bgs.										
288										
289										
290										
291										
292										
293										
294										
295										
296										
297										
298										
299										
300										

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1							(0.0 - 87.0') (NR); Core not collected or logged, no recovery, see boring log MW-Rd for lithology		(0.0 - 133.0') No water used
2									
3	60								
4									
5									
6									
7									
8	60								
9									
10		No Sieve Samples Collected			NR			(10.0 - 14.0') 12 inch conductor casing dropped and mud tub seal had to be reset	
11									
12									
13									
14	96								
15									
16									
17								(15.0') 12 inch casing dropped to 15 ft. bgs reset mud tub seal, driller indicated formation was collapsing @ 17 ft. bgs, when examining core, ~1 ft boulder was observed, will pay close attention to borehole when installing well	
18									
19	108								
20									

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Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21									(0.0 - 133.0') No water used
22									
23									
24	108								
25									
26									
27									
28								(27.0') Tight formation	
29									
30		No Sieve Samples Collected			NR				
31									
32	120								
33									
34									
35									
36									
37									
38	60								
39									
40									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Boring Log

Sheet: 3 of 8

Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	Project Number: RC000753.0051
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	60								(0.0 - 133.0') No water used
42									
43									
44									
45	60								
46									
47									
48									
49									
50		No Sieve Samples Collected			NR				
51									
52	120								
53									
54									
55									
56									
57									
58	120								
59									
60									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	Project Number: RC000753.0051
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61									(0.0 - 133.0') No water used
62									
63									
64	120								
65									
66									
67									
68									
69									
70		No Sieve Samples Collected			NR				
71									
72	120								
73									
74									
75									
76									
77									
78									
79	120								
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	120			NR	NR				(0.0 - 133.0') No water used
82									
83									
84									
85									
86	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SW-SM		(87.0 - 88.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subangular; and granules to very large pebbles, angular to subangular; little silt; trace cobbles, subangular; trace mica; moist; cobble at bottom of formation, coarser clasts consist of grandodiorite and metadiorite		
87									
88				Topock - Alluvium Deposits	GM		(88.5 - 95.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3); granules to small cobbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; little silt; coarser clasts composed of metadiorite; moist		
89									
90									
91							(91'); some silt; trace clay; decrease in granules to very large pebbles		
92									
93							(93'); increase in granules to small cobbles		
94									
95									
96				Topock - Alluvium Deposits	SM		(95.5 - 98.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subangular; and granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; coarser clasts composed of metadiorite; wet		
97									
98	60			Topock - Alluvium Deposits	SW-SM		(98.5 - 100.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subangular; and granules to very large pebbles, angular to subangular; little silt; wet; larger clasts consist of metadiorite		
99									
100									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	06/16/2019	Surface Elevation:	N/A	Boring No.: MW-Rs
Date Completed:	06/17/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Eddie Ramos	Depth to First Water:	90.27 ft bgs	
Drilling Asst:	L. Amaya/ O. Flores	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	G. Jeffers / A. Mack	Sampling Interval:	Screen Intervals	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	60			Topock - Alluvium Deposits	SM		(100.5 - 102.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subround; little silt; wet; larger clasts consist of metadiorite		(0.0 - 133.0') No water used
102							(102.0 - 108.0') (NR)	(102.0 - 108.0') Heaving sands	
103									
104									
105									
106									
107									
108									
109				Topock - Alluvium Deposits	SM		(108.0 - 110.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subangular; some granules to large pebbles, angular to subround; little silt; wet; 35,50,15,0		
110							(110.0 - 117.0') (NR); Core not collected or logged, no recovery, see boring log MW-Rd for lithology	(110.0 - 117.0') Core not collected	
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started:	06/16/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Rs</u>
Date Completed:	06/17/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Eddie Ramos	Depth to First Water:	90.27 ft bgs	
Drilling Asst:	L. Amaya/ O. Flores	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	G. Jeffers / A. Mack	Sampling Interval:	Screen Intervals	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	60		MW-R-VAS-117-122 (5.8 ppb) 5/14/2019 10:14	Topock - Alluvium Deposits	SM		to subround; little silt; trace clay; coarser clasts composed of metadiorite; wet (120') brown (7.5YR 4/3) with dusky red (10R 3/3); trace cobbles, subangular to subround; mottled		(0.0 - 133.0') No water used
122									
123							(122.0 - 129.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); dark brown (7.5YR 3/3); granules to very large pebbles, subangular to subround; and very fine to very coarse grained sand, angular to subround; little silt; coarser clasts composed of metadiorite; wet		
124									
125									
126				Topock - Alluvium Deposits	GW-GM		(125') dark brown (7.5YR 3/3) with dusky red (10R 3/3); trace cobbles, angular to subangular; mottled		
127	120								
128									
129									
130				Topock - Alluvium Deposits	GM		(129.0 - 132.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); dark brown (7.5YR 3/3); granules to very large pebbles, subangular to subround; little very fine to very coarse grained sand, subangular to subround; little silt; trace cobbles, subangular to subround; coarser clasts composed of metadiorite; wet		
131									
132									
133									
134				Topock - Alluvium Deposits	GW-GM		(132.0 - 137.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); dark brown (7.5YR 3/3); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; little silt; coarser clasts composed of metadiorite; wet (133') dark brown (7.5YR 3/3) with dusky red (10R 3/3); mottled	(133.0 - 143.0') Water used to blow out fines before well install, volume of water used and recovered not documented	
135									
136	132								
137									
138				Topock - Alluvium Deposits	SM		(137.0 - 139.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subround; some granules to large pebbles, angular to subround; little silt; coarser clasts composed of metadiorite; wet; metadiorite boulder fragments in 6" silt matrix at 137.5 ft bgs, 1" clay lens at 138 ft bgs		
139				Topock - Alluvium Deposits	SW-SM		(139.0 - 143.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/3) with dusky red (10R 3/3); very fine grained to very coarse grained, angular to subangular; some		
140									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Date Started: 06/16/2019	Surface Elevation: N/A	Boring No.: MW-Rs
Date Completed: 06/17/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 143 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 10-12 inches	Location: PG&E Topock, Needles, California
Driller Name: Eddie Ramos	Depth to First Water: 90.27 ft bgs	
Drilling Asst: L. Amaya/ O. Flores	Sampling Method: 4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger: G. Jeffers / A. Mack	Sampling Interval: Screen Intervals	
Editor: Sean McGrane	Converted to Well: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	132	No Sieve Samples Collected		Topock - Alluvium Deposits	SW-SM		granules to very large pebbles, angular to subround; little silt; coarser clasts composed of metadiorite; wet; mottled	(133.0 - 143.0') Water used to blow out fines before well install, volume of water used and recovered not documented	
142									
143							End of Boring at 143.0' bgs.		
144									
145									
146									
147									
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

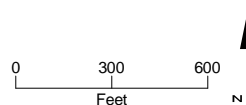
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval MW-Rd, VAS collected during drilling MW-Rd

Attachment C
Soil Sampling Locations and Available Soil
Analytical Results
(Soil Data Presented in Excel File)



LEGEND

- Soil Sample Collected from this Location in July 2019
- Soil Sample Location



Baseline and Opportunistic Soil Sampling Locations

Monthly Progress Report
Groundwater Remedy Phase 1 Construction
PG&E Topock Compressor Station, Needles, California

JACOBS

Attachment D
Perimeter Air Sampling Analytical Results

Attachment D. Perimeter Air Sampling Analytical Results

In conformance with the approved *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (CH2M, 2015), air monitoring has been conducted during construction to evaluate the ongoing effectiveness of the dust control program, to guide modifications to field activities and engineering control measures, if necessary, and to document that construction activities do not result in the migration of soil contaminants beyond the work area boundaries.

Perimeter air monitoring has been performed if construction activities have the potential to generate visible dust. The air monitoring program consists of both real-time fugitive dust monitoring and perimeter air sampling for select soil contaminants. Locations to be monitored and sampled are as follows:

- Real-time fugitive dust monitoring is performed at the perimeter of the work areas (outside of the exclusion zone) that have the potential to generate visible dust, including the Construction Headquarters (CHQ) and the Soil Processing Yard (SPY).
- Perimeter air sampling for hexavalent chromium is performed at the perimeter of the work areas (outside of the exclusion zone) that are inside Areas of Concern (AOCs) within the construction footprint where hexavalent chromium concentrations in soil have been historically reported. Air sampling for hexavalent chromium in the SPY will be performed when soil from AOCs with reported concentrations of hexavalent chromium is actively being processed. Air sampling may also be performed at other work areas at the site based on hexavalent chromium concentrations reported from new soil data or based on field observations during construction activities.
- Air sampling for asbestos will be limited to work areas where Asbestos Containing Material (ACM) has been observed in prior field investigations, including two areas in AOC 12 and one area in AOC 4. Perimeter air monitoring may also be performed at other work areas at the site if ACM is discovered during construction activities.

Project-specific levels of concern (LOC) and action levels were developed as an indicator to determine whether additional dust control measures, as presented in the project's Dust Control Plan required by the Mojave Desert Air Quality Management District (MDAQMD), are necessary.

- The LOCs, which represent conservative concentrations of compounds that receptors outside the work area could be safely exposed to during construction, have been evaluated for all compounds that have been detected in soil samples collected at the site in the prior investigations. The LOCs were developed using standard U.S. Environmental Protection Agency (USEPA) and California Environmental Protection Agency risk assessment methodology, toxicology data, and exposure assumptions (USEPA, 2009, 2017; California Department of Toxic Substances Control [DTSC], 2018). Both cancer and noncancer health effects were considered. For each type of health effect, the LOC was back-calculated from an established target or from acceptable cancer risk or noncancer hazard where USEPA or DTSC toxicity values are available. The LOCs for cancer effects are based on a target excess cancer risk of one in a million (1×10^{-6}). The LOCs for noncancer effects are based on a target hazard quotient of 1. The LOCs were developed using these assumptions:
 - Receptors are present outside the perimeter of the work areas
 - Exposure via inhalation is 10 hours per day for a 10 days on /4 days off schedule
 - Duration of Phase 1 of the final groundwater remedy construction is 20 months
- The action level for fugitive dust monitoring is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for a net (downwind minus upwind) dust concentration. This action level is based on MDAQMD Rule 403, Part C. A 10-hour time-weighted average of readings collected throughout the work day will be used to document compliance with MDAQMD Rule 403.
- For analytes detected in soil, the following equation was used to calculate maximum allowable airborne particulate concentrations for receptor exposure outside the work area (based on the approach presented by Marlowe (1999):

$$AL = \frac{LOC \times 1,000,000 \text{ mg/kg}}{CS}$$

Where:

AL = action level for airborne particulates ($\mu\text{g}/\text{m}^3$)

LOC = Project specific risk-based level of concern ($\mu\text{g}/\text{m}^3$)

CS = maximum detected concentration of compound in site soil (milligrams per kilogram [mg/kg])

Action levels were determined as follows:

- Soil data from prior investigations were gathered for the entire site.
- Sample locations within the maximum construction footprint were evaluated. Some sample locations were removed from evaluation as they were within the compressor station in locations where no construction activities will actually occur.
- The maximum reported soil concentration for each compound was determined and then used to calculate an airborne particulate action level.
- All compounds had allowable airborne particulate action levels greater than $100 \mu\text{g}/\text{m}^3$ except for hexavalent chromium at a few locations.
- Lead does not have USEPA or DTSC toxicity values; however, an action level was calculated using the DTSC (2011) LeadSpread 8 model. This is based on the maximum reported soil concentration for lead of 1,400 mg/kg from samples collected within the construction footprint and a blood level of concern through inhalation of 1 microgram per deciliter. The resulting action level for lead is $548 \mu\text{g}/\text{m}^3$.
- Therefore, keeping fugitive dust below the action level $100 \mu\text{g}/\text{m}^3$ will result in airborne particulate concentrations of contaminants (other than hexavalent chromium) remaining below their respective LOCs.
- Fugitive dust monitoring will be used to evaluate airborne contaminants in dust for all compounds except for hexavalent chromium.

In July 2019, 171 real time dust observation/monitoring events were conducted at the perimeter of the work areas (outside of the exclusion zone). There was one temporary exceedance of the action level for fugitive dust monitoring ($100 \mu\text{g}/\text{m}^3$) on July 1, 2019 due to construction vehicle movement in the floodplain. Contractor applied water to reduce fugitive dust.

No perimeter air sampling was conducted in July 2019. Table 1 presents analytical results from previous air sampling events.

References Cited:

California Department of Toxic Substances Control (DTSC). 2011. LeadSpread 8.
<https://www.dtsc.ca.gov/AssessingRisk/LeadSpread8.cfm>.

California Department of Toxic Substances Control (DTSC). 2018. Human Health Risk Assessment Note 3 – DTSC-Modified Screening Levels (DTSC-SLs), California Department of Toxic Substances Control, Human and Ecological Risk Office (HERO). January.

CH2M HILL, Inc. (CH2M). 2015. *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

Marlowe, C. 1999. *Safety Now! Controlling Chemical Exposures at Hazardous Waste Sites with Real-Time Measurements*. Fairfax, Va.: American Industrial Hygiene Association Press.

U.S. Environmental Protection Agency (USEPA). 2009. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)*. Final. OSWER 9285.7-82. January.

U.S. Environmental Protection Agency (USEPA). 2017. Regional Screening Levels (RSLs)—Generic Tables. November.

Table 1. Perimeter Air Sampling Results

July 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California

Location ID	Location	Date	Sample Type	Hexavalent Chromium (ug/m ³)
AOC13-D1	AOC13 Downwind 1	10/09/18	N	0.000732 J
AOC13-D2	AOC13 Downwind 2	10/09/18	N	0.000709 J
AOC13-U	AOC13 Upwind	10/09/18	N	ND (0.000172)
AOC30-IRZ-23-D1	AOC30-IRZ-23 Downwind 1	2/20/2019	N	ND (0.0000859)
AOC30-IRZ-23-D2	AOC30-IRZ-23 Downwind 2	2/20/2019	N	ND (0.0000862)
AOC30-IRZ-23-U1	AOC30-IRZ-23 Upwind	2/20/2019	N	0.000104 J
AOC4-D1	AOC4 Downwind 1	5/14/2019	N	ND (0.000148)
AOC4-D2	AOC4 Downwind 2	5/14/2019	N	ND (0.000155)
AOC4-U	AOC4 Upwind	5/14/2019	N	ND (0.000148)
AOC11-D1	AOC11 Downwind 1	5/15/2019	N	ND (0.0000392)
AOC11-D2	AOC11 Downwind 2	5/15/2019	N	0.0001262 J
AOC11-U	AOC11 Upwind	5/15/2019	N	ND (0.0000386)
AOC4-D1	AOC4 Downwind 1	5/16/2019	N	0.0000423 J
AOC4-D2	AOC4 Downwind 2	5/16/2019	N	ND (0.0000385)
AOC4-U	AOC4 Upwind	5/16/2019	N	ND (0.0000378)
AOC30-D1	AOC30 Downwind 1	6/17/2019	N	ND (0.0000633)
AOC30-D2	AOC30 Downwind 2	6/17/2019	N	ND (0.0000636)
AOC30-U1	AOC30 Upwind	6/17/2019	N	ND (0.0000589)
AOC30-D1	AOC30 Downwind 1	6/18/2019	N	0.0000407 J
AOC30-D2	AOC30 Downwind 2	6/18/2019	N	ND (0.0000313)
AOC30-U1	AOC30 Upwind	6/18/2019	N	ND (0.000031)

Notes:

ug/m³ micrograms per cubic meter
J concentration or reporting limit estimated by laboratory or data validation
N primary sample
ND not detected at the listed reporting limit

Attachment E
Noise Monitoring Results
(SEIR NOISE-2 Requirement)

Attachment E. Noise Monitoring Results

In conformance with the SEIR Mitigation Measure NOISE-2, noise monitoring has been conducted with ANSI S1.4 Type 1, precision sound level meters when construction activities are within the specified distance (e.g., 1,850 feet from sensitive receptors in California) at approved monitoring locations previously determined in coordination with the Tribes and land owners/managers (refer to Figures 1, 2 and 3). The goal of the noise monitoring is to identify if noise levels from project construction activities exceed applicable standards of the San Bernardino and Mohave County codes. Exceedance of standards would require coordination with the Tribes and land owners/managers to evaluate the potential constraints and locations for temporary engineered acoustical barriers. Consistent with the request of the Tribes, monitoring equipment is not left at the approved monitoring locations, rather it is mounted on a tripod for attended representative measurements and removed when the monitoring event is complete.

When a new construction activity is conducted or a previously monitored construction activity is conducted closer to a noise-sensitive area, monitoring is conducted at more frequent intervals to evaluate the potential need for an acoustical barrier. As the activities continue in the same location and multiple attended measurements indicate that the applicable standard has not been exceeded by the construction activity, periodic attending monitoring events are conducted to confirm continued compliance.

The attended monitoring events document the A-weighted L_{eq} sound level at periodic intervals (e.g., 5, 10, 15, 20, 30, 40, 50 and 60 minutes). The trend of the data at these intervals is evaluated in the field to assess the stability in the sound level to determine the duration of the monitoring event. When this interval data is relatively stable or clearly below the standard, the attended monitoring event will typically be 15 to 30 minutes in duration. As the applicable standards are in terms of the 24-hour average L_{dn} which is based on the L_{eq} metric, the measured L_{eq} is compared to the applicable L_{dn} standard for mobile noise sources (i.e., 60 A-weighted decibels [dBA] for Park Moabi, 65 dBA at all other locations). This results in a reasonable and conservative assessment given construction activities are not emitting noise continuously over a 24-hour period, nor are they occurring during the nighttime hours (10 p.m. to 7 a.m.).

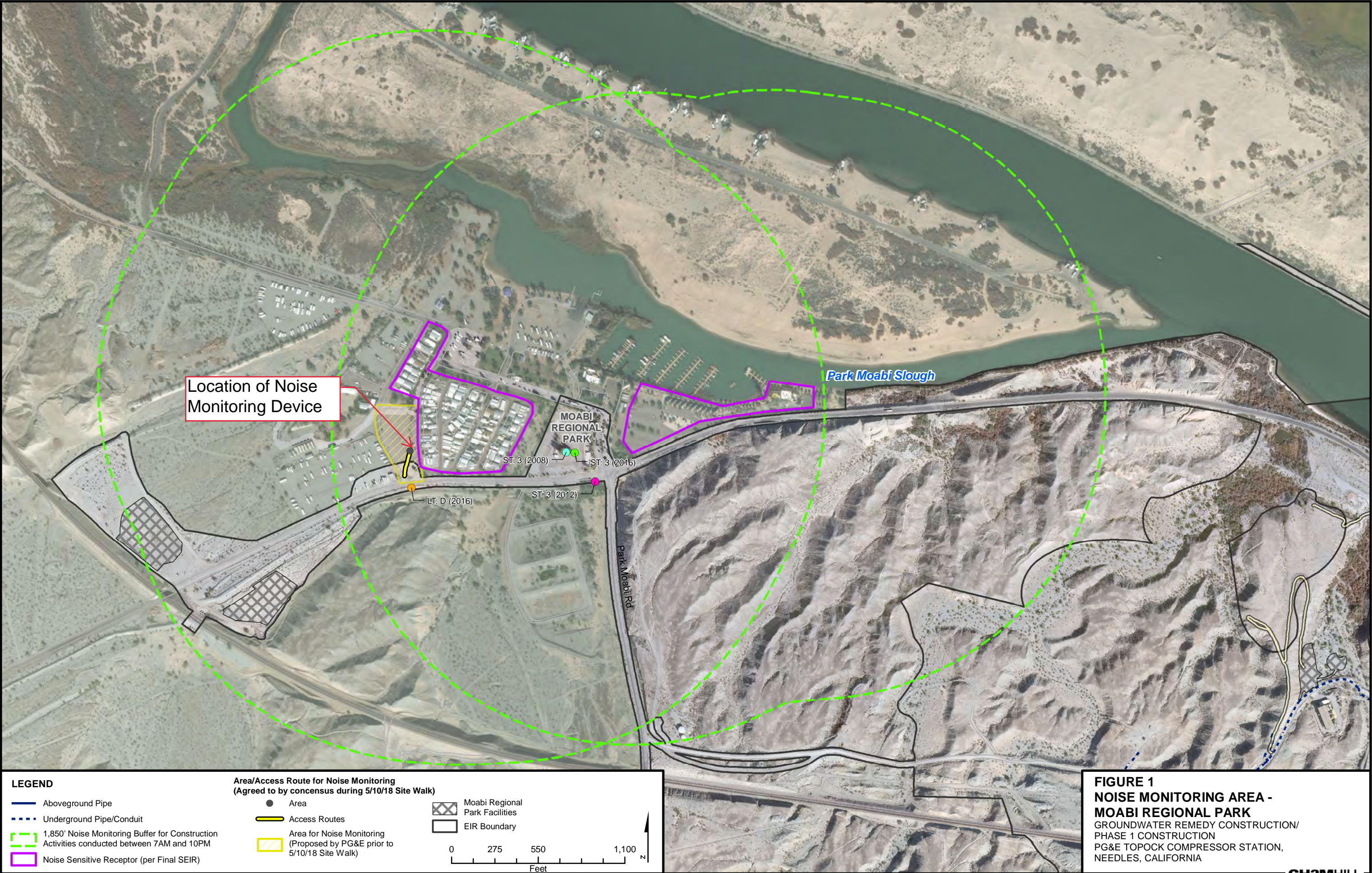
In July 2019, 23 monitoring events have been conducted at the Park Moabi monitoring location (Figure 1). Construction activities closest to this monitoring location include activities at the SPY and CHQ, as well as construction traffic on NTH. The sound level typically varied between 39 and 56 dBA, with an average and median of just above 48 dBA.

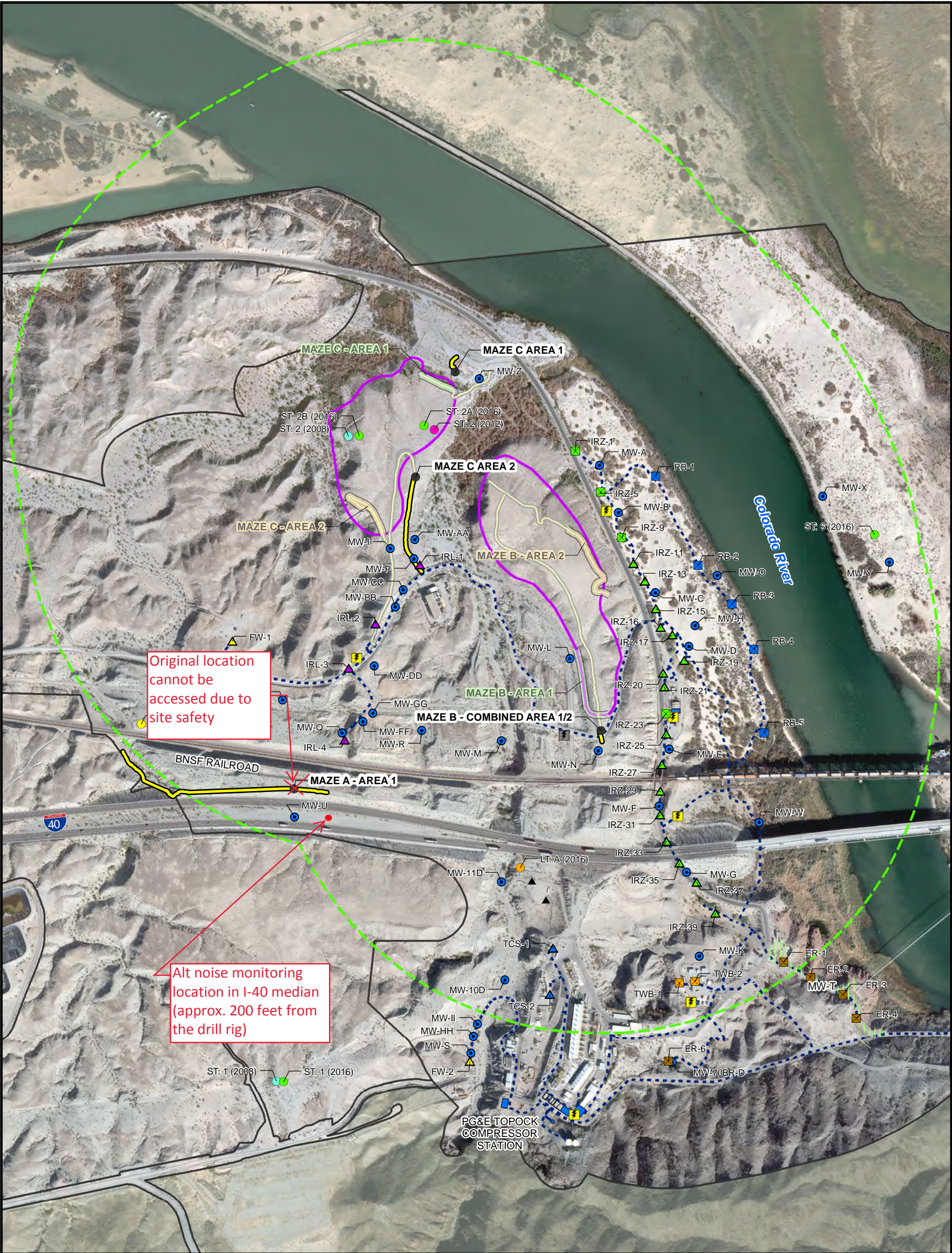
In July 2019, 23 monitoring events have been conducted at Maze B-Combined Area 1/2 (Figure 2). Construction activities closest to this monitoring location include activities at MW-20 Bench, and construction traffic on the access road. The sound levels varied between 46 and 63 dBA, with an average and median of 53 dBA.

In July 2019, 23 monitoring events have been conducted at Maze C-Area 1 (Figure 2). Construction activities closest to this monitoring location include construction traffic on NTH, pipeline and access road construction activities in the northern end of the floodplain. The sound level typically varied between 42 and 60 dBA, with an average and median of 50-51 dBA.

In July 2019, 13 monitoring events have been conducted at the mobile home park in Topock Marina (Figure 4). Construction activities closest to this monitoring location are associated with drilling at MW-X. The sound level typically varied between 49 and 66 dBA, with an average of 60 dBA and median of 61 dBA. Sound levels spiked when there are boat traffic, train traffic, and bird activities around the mobile homes.

Monitoring will continue as work progresses and moves into new areas to identify when an acoustical barrier needs to be considered.





LEGEND

Planned Wells:

- Extraction, East Ravine
- Extraction, NTH IRZ
- Extraction, Riverbank
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Recirculation Well
- Area for Monitoring Well MW-T

Pipeline Corridor for Remedy

- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure
- Contingent Freshwater Pre-injection Treatment System
- 1,850' Noise Monitoring Buffer for Construction Activities conducted between 7AM and 10PM
- Noise Sensitive Receptor (per Final SEIR)
- EIR Boundary

Areas/Access Routes for Noise Monitoring (Agreed to by consensus during 5/10/18 Site Walk)

- Area
- Access Route

Areas for Noise Monitoring (Proposed by PG&E Prior to 5/10/18 Site Walk)

- Area 1
- Area 2
- Access Route

0 275 550 1,100

Feet

FIGURE 2

NOISE MONITORING AREAS-NORTH OF I-40

GROUNDWATER REMEDY CONSTRUCTION/ PHASE 1 CONSTRUCTION

PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL



LEGEND

- Extraction Well
- ⊕ Injection Well
- Monitoring Well
- ⊕ Water Supply Well
- Railroad
- 330' Noise Monitoring Buffer for Construction Activities conducted between 7AM and 10PM
- Noise Monitoring Station

- Access route to noise monitoring locations
- Noise monitoring locations

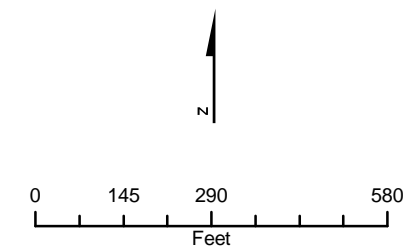


FIGURE 4
NOISE MONITORING AREA -
TOPOCK 66 SPA & RESORT
AND ADJACENT RESIDENCES
 GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
 PG&E TOPOCK COMPRESSOR STATION
 NEEDLES, CALIFORNIA

Attachment G
Six-Week Look-Ahead Schedule
(August 4 through September 14, 2019)

Dishcharge Monitoring Record



PIVOT
Corporation

PGE Project / Property Name: Topock Final Remedy

Project Number: ARC-18-T46

Affected System: Pipeline C5 STA 17+80 to C3 14+85

Discharge Date	C6 Discharge Location - Approximate QTY (gal)	C5 Discharge Location - Approximate QTY (gal)	Discharge Monitor Initials*
5/17/2019	6,300	--	ST
5/20/2019	1,800	5400	ST
5/21/2019	2,700	--	ST
5/22/2019	3,100	3,000	ST
5/23/2019	--	4,500	ST
5/24/2019	--	4,500	ST
5/28/2019	--	300	ST
6/4/2019	--	300	DZ
6/5/2019	--	800	DZ

* By signing this record form, I acknowledge that all ground discharge has been observed and monitored for the following compliance requirements:

- a.No ponding of discharge water
- b.No attracting wildlife
- c.No channelizing of discharge water and runoff outside of work area
- d.No water discharged to washes or jurisdictional waters

Attachment F
Discharge Monitoring Record in
compliance with Monitoring and Reporting
Program for Order No. 2003-0003-DWQ
(Table 2)

PG&E Topock Final Groundwater Remedy	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Primary Planned Activities	8/4/2019	8/5/2019	8/6/2019	8/7/2019	8/8/2019	8/9/2019	8/10/2019
Start Time (PST)			6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM
Pipeline C Installation E5, F5	No Work	No Work	Site cleanup and equipment demobilization from floodplain	Site cleanup and equipment demobilization from floodplain	Site cleanup and equipment demobilization from floodplain	Site cleanup and equipment demobilization from floodplain	
TCS Approach Pipeline Installation F5, G5, G6			Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J
Well Installation			MW-C (E5), MW-B-267 site prep (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-C (E5), MW-B-267 site prep (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-C (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-C (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-X (E6), MW-H (E5), RB-4 (E5)
Well Development			IRZ-21 (E5)	IRZ-21 (E5)	IRZ-23 (E5)	IRZ-23 (E5)	IRZ-23 (E5)
Well Testing			--	--	--	--	--
Primary Planned Activities	8/11/2019	8/12/2019	8/13/2019	8/14/2019	8/15/2019	8/16/2019	8/17/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	No Work
Well Installation	MW-B-267 (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-D site prep (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-D site prep (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	--	
Well Development	IRZ-23 (E5)	--	--	--	MW-R-139 (F5)	--	
Well Testing	--	IRZ-23 (E5)	IRZ-23 (E5)	IRZ-23 (E5)	--	--	
Primary Planned Activities	8/18/2019	8/19/2019	8/20/2019	8/21/2019	8/22/2019	8/23/2019	8/24/2019
Start Time (PST)			6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM
Pipeline C Installation E5, F5	No Work	No Work	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6
TCS Approach Pipeline Installation F5, G5, G6			Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J
Well Installation			MW-B-267 (E5), MW-X (E6), MW-H (E5), RB-4 (E5)	MW-B-267 (E5), MW-Y (E6), MW-H (E5), RB-4 (E5)	MW-D (E5), MW-Y (E6), MW-H (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), MW-H (E5), IRZ-19 site prep (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), MW-H (E5), IRZ-19 site prep (E5), RB-3 (E5)
Well Development			--	--	--	--	--
Well Testing			IRZ-21 (E5)	IRZ-21 (E5)	IRZ-21 (E5)	IRZ-21 (E5)	IRZ-21 (E5)
Primary Planned Activities	8/25/2019	8/26/2019	8/27/2019	8/28/2019	8/29/2019	8/30/2019	8/31/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
Pipeline C Installation E5, F5	--	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	No Work
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	
Well Installation	MW-D (E5), MW-Y (E6), MW-H (E5), IRZ-19 site prep (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), MW-H (E5), IRZ-19 site prep (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	--	
Well Development	MW-C (E5)	MW-C (E5)	MW-C (E5)	MW-C (E5)	MW-C (E5)	--	
Well Testing	--	--	--	--	--	--	
Primary Planned Activities	9/1/2019	9/2/2019	9/3/2019	9/4/2019	9/5/2019	9/6/2019	9/7/2019
Start Time (PST)				6:30 AM	6:30 AM	6:30 AM	6:30 AM
Pipeline C Installation E5, F5	No Work	No Work Labor Day	No Work	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6
TCS Approach Pipeline Installation F5, G5, G6				Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J
Well Installation				MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)	MW-D (E5), MW-Y (E6), IRZ-19 (E5), RB-3 (E5)
Well Development				MW-B (E5)	MW-B (E5)	MW-B (E5)	RB-5 (E5)
Well Testing				--	--	--	--
Primary Planned Activities	9/8/2019	9/9/2019	9/10/2019	9/11/2019	9/12/2019	9/13/2019	9/14/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
Pipeline C Installation E5, F5	--	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	Tentative: Pipeline installation @ C6	No Work
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	
Well Installation	MW-D (E5), MW-Y (E6), MW-S (G5), RB-3 (E5)	MW-D (E5), MW-Y (E6), MW-S (G5), RB-3 (E5)	MW-D (E5), MW-Y (E6), MW-S (G5), RB-2 (E5)	MW-D (E5), MW-Y (E6), MW-S (G5), RB-2 (E5)	MW-D (E5), MW-Y (E6), MW-S (G5), RB-2 (E5)	--	
Well Development	RB-5 (E5)	RB-5 (E5)	RB-5 (E5)	--	--	--	
Well Testing	--	--	--	IRZ-20 (E5)	IRZ-20 (E5)	IRZ-20 (E5)	


The timing of field activities are estimated and may change day-to-day based on site conditions, field progress, or other factors.
When planning to visit the site to observe a specific activity or area, please contact Curt Russell (760-791-5884) for the latest schedule information.
"G5" - Intrusive work location as described on the project grid map. See Project Grid Map tab for location of grid positions provided on the look-ahead


Attachment H
Available Groundwater Monitoring Data
(DTSC Condition of Approval xi)


Attachment H. Available Groundwater Monitoring Data


Pursuant to Condition of Approval # xi in DTSC's approval letter dated August 24, 2018 (DTSC, 2018a), PG&E is required to report data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection. In compliance with this requirement, PG&E initially submitted validated data to DTSC via monthly emails. For ease of recordkeeping and to minimize the number of ad-hoc compliance reports/emails, PG&E has since included validated data in each monthly progress report starting with the November 2018 report.

<div><div><div><div><div></div><div>ARCADIS</div></div><div><div>Design & Consultancy</div><div>for natural and built assets</div></div></div><div><div>GMP 2019-05 Sampling</div></div></div></div>						Lab Description	ASSET Arsenic, dissolved SW 6020 ug/L	ASSET Chromium, Hexavalent EPA 218.6 ug/L	ASSET Chromium, total dissolved SW 6020 ug/L	ASSET Manganese, dissolved SW 6020 ug/L	ASSET Molybdenum, dissolved SW 6020 ug/L	ASSET Nitrate/Nitrite as Nitrogen SM 4500-NO3 F mg/L	ASSET Selenium, dissolved SW 6020 ug/L	ASSET Specific conductance EPA 120.1 uS/cm	EMXT Arsenic, dissolved SW 6020A ug/L	EMXT Chromium, Hexavalent EPA 218.6 ug/L	EMXT Chromium, total dissolved SW 6020A ug/L	EMXT Manganese, dissolved SW 6020A ug/L	EMXT Specific conductance EPA 120.1 uS/cm
Location ID	Sample ID	Sample Type	Parent Sample ID	Matrix	Date Sampled														
MW-09	MW-09-Q219	N		GW	5/17/2019	1.8	150	150	ND (0.5)	4.4	12	5.7	3,200						
MW-10	MW-10-Q219	N		GW	5/17/2019		180	180		20	12	6.4	3,100						
MW-10	MW-901-Q219	FD	MW-10-Q219	GW	5/17/2019		180	180		19	12	6.7	3,100						
MW-11	MW-11-Q219	N		GW	5/17/2019	1.4	51	49	1.5	4.8	5.1	4.7	2,300						
MW-12	MW-12-Q219	N		GW	5/22/2019		1,600	1,600		6.3	16	32	6,900						
MW-14	MW-14-Q219	N		GW	5/15/2019	0.7	14	13	ND (0.5)	11	3.1	2	2,800						
MW-19	MW-19-Q219	N		GW	5/15/2019		250	250					2,000						
MW-20-070	MW-20-070-Q219	N		GW	5/24/2019		1,700	1,800		35	8.7	7.1	1,800						
MW-20-100	MW-20-100-Q219	N		GW	5/24/2019		1,300	1,500		3.7	7.9	6	2,200						
MW-20-130	MW-20-130-Q219	N		GW	5/24/2019	4.6	5,900	6,800	1.7	42	11	34	10,000						
MW-20-130	MW-902-Q219	FD	MW-20-130-Q219	GW	5/24/2019	4.5	6,000	6,800	2.2	40	11	36	10,000						
MW-21	MW-21-Q219	N		GW	5/23/2019		6.5	6.7		59	0.69	13	12,000						
MW-23-060	MW-23-060-Q219	N		GW	5/21/2019	5.7	40	35	ND (0.5)				16,000						
MW-23-080	MW-23-080-Q219	N		GW	5/21/2019	5.6	ND (1.0)	1.1	ND (0.5)				17,000						
MW-24A	MW-24A-Q219	N		GW	5/17/2019	ND (0.1)	ND (0.2)	ND (1.0)	16	110	0.051	ND (0.5)	1,600						
MW-24B	MW-24B-Q219	N		GW	5/17/2019	3.1	86	73	100	56	0.71	ND (2.5)	20,000						
MW-24B	MW-903-Q219	FD	MW-24B-Q219	GW	5/17/2019	3	84	73	100	55	0.71	ND (2.5)	20,000						
MW-25	MW-25-Q219	N		GW	5/15/2019	1.3	68	66	ND (0.5)	4.2	12	8.4	2,000						
MW-26	MW-26-Q219	N		GW	5/22/2019	1.9	2,300	2,500	ND (0.5)	30	21	39	3,700						
MW-28-025	MW-28-025-Q219	N		GW	5/21/2019	0.81	ND (0.2)	ND (1.0)	ND (0.5)	4.4	ND (0.05)	ND (0.5)	1,000						
MW-28-090	MW-28-090-Q219	N		GW	5/21/2019	2.2	ND (0.2)	ND (1.0)	280	23	ND (0.05)	ND (0.5)	4,600						
MW-29	MW-29-Q219	N		GW	5/21/2019	15	ND (0.2)	ND (1.0)	300	30	ND (0.05)	ND (0.5)	2,500						
MW-31-060	MW-31-060-Q219	N		GW	5/20/2019	1	250	240	0.7				3,800						
MW-31-060	MW-904-Q219	FD	MW-31-060-Q219	GW	5/20/2019	1	250	240	ND (0.5)				3,900						
MW-33-150	MW-33-150-Q219	N		GW	5/21/2019	1.7	5.5	21	74	48	1.5	0.93	14,000						
MW-35-060	MW-35-060-Q219	N		GW	5/24/2019	1.3	24	22	ND (0.5)	11	2	1.5	4,600						
MW-35-135	MW-35-135-Q219	N		GW	5/24/2019	0.82	28	24	1.3	19	2.4	1.3	9,200						
MW-37D	MW-37D-Q219	N		GW	5/20/2019		6.2	6		60	0.55	ND (0.5)	14,000						
MW-38D	MW-38D-Q219	N		GW	5/17/2019	7.2	21	17	21	80	ND (0.05)	ND (2.5)	22,000						
MW-38S	MW-38S-Q219	N		GW	5/17/2019	5.8	6	5.7	46	22	5.2	3.7	1,700						
MW-40D	MW-40D-Q219	N		GW	5/22/2019	4.5	120	120	ND (0.5)	54	2.5	2	15,000						
MW-40D	MW-906-Q219	FD	MW-40D-Q219	GW	5/22/2019	4.5	120	120	ND (0.5)	54	2.6	1.9	15,000						
MW-40S	MW-40S-Q219	N		GW	5/22/2019	2.7	12	15	1.8	18	5.6	5.6	2,100						
MW-41D	MW-41D-Q219	N		GW	5/15/2019	2.4	ND (1.0)	ND (1.0)	180	73	ND (0.05)	ND (0.5)	18,000						
MW-46-175	MW-46-175-Q219	N		GW	5/21/2019		7.6	9.1		190	1.1	0.78	17,000						
MW-46-205	MW-46-205-Q219	N		GW	5/21/2019		2.4	2.7					21,000						
MW-47-055	MW-47-055-Q219	N		GW	5/16/2019	1.1	17	15	ND (0.5)				4,800						
MW-47-055	MW-907-Q219	FD	MW-47-055-Q219	GW	5/16/2019	1.1	17	15	ND (0.5)				4,700						
MW-47-115	MW-47-115-Q219	N		GW	5/16/2019		27	23					12,000						
MW-48	MW-48-Q219	N		GW	5/23/2019		ND (1.0)	ND (1.0)					17,000						
MW-50-095	MW-50-095-Q219	N		GW	5/20/2019		13	12					5,600						
MW-50-200	MW-50-200-Q219	N		GW	5/20/2019		5,800	6,200					21,000						
MW-51	MW-51-Q219	N		GW	5/22/2019	4.1	3,300	3,800	ND (0.5)	48	8.3	15	13,000						
MW-54-085	MW-54-085-Q219	N		GW	5/23/2019									ND (2.0)					
MW-54-140	MW-54-140-Q219	N		GW	5/23/2019									ND (2.0)					
MW-54-195	MW-54-195-Q219	N		GW	5/23/2019									ND (2.0)					
MW-55-045	MW-55-045-Q219	N		GW	5/23/2019									ND (0.1)					
MW-55-120	MW-55-120-Q219	N		GW	5/23/2019									ND (2.0)					
MW-56D	MW-56D-Q219	N		GW	5/23/2019									ND (0.5)					
MW-56M	MW-56M-Q219	N		GW	5/23/2019									ND (0.5)					
MW-56S	MW-56S-Q219	N		GW	5/23/2019									ND (0.1)					
MW-57-070	MW-57-070-Q219	N		GW	5/20/2019	1.3	380	400	1.2	4	9.6	3.2	2,600						
MW-57-185	MW-57-185-LF_S-Q219	N		GW	5/20/2019	3.4	4.6	5.2	6.2 J	81	0.11	ND (2.5)	18,000						
MW-57-185	MW-909-Q219	FD	MW-57-185-LF_S-Q219	GW	5/20/2019	3.4	4.7	5.1	4.8 J	83	0.1	ND (2.5)	18,000						
MW-58BR	MW-58BR-Q219	N		GW	5/21/2019	1.9	12	14	270	26	0.68	1.9	8,200						
MW-59-100	MW-59-100-Q219	N		GW	5/20/2019	2.3	2,000	2,200	ND (0.5)	9.4	1.7	1.8	14,000						
MW-59-100	MW-910-Q219	FD	MW-59-100-Q219	GW	5/20/2019	2.2	2,200	2,300	2.9	9	1.7	1.9	14,000						
MW-60-125	MW-60-125-Q219	N		GW	5/22/2019	1.6	880	890	4.3	17	3.7	6.2	8,700						
MW-60BR-245	MW-60BR-245-3V-Q219	N		GW	5/22/2019	8.8	130	120	7.9	60	0.3	2.7	16,000						
MW-60BR-245_D	MW-60BR-245-LF_D-Q219	N		GW	5/23/2019	9.2	68	61	6.7	63	0.22	3.2	17,000						
MW-60BR-245_S	MW-60BR-245-LF_S-Q219	N		GW	5/23/2019	8.7	85	74	6.7	59	0.22	2.7	17,000						

<div><div>ARCADIS</div><div>Design & Consultancy for natural and built assets</div></div> <div>GMP 2019-05 Sampling</div> <div>Lab Description Method Unit</div> <div>ASSET Arsenic, dissolved SW 6020 ug/L</div> <div>ASSET Chromium, Hexavalent EPA 218.6 ug/L</div> <div>ASSET Chromium, total dissolved SW 6020 ug/L</div> <div>ASSET Manganese, dissolved SW 6020 ug/L</div> <div>ASSET Molybdenum, dissolved SW 6020 ug/L</div> <div>ASSET Nitrate/Nitrite as Nitrogen SM 4500-NO3 F mg/L</div> <div>ASSET Selenium, dissolved SW 6020 ug/L</div> <div>ASSET Specific conductance EPA 120.1 uS/cm</div> <div>EMXT Arsenic, dissolved SW 6020A ug/L</div> <div>EMXT Chromium, Hexavalent EPA 218.6 ug/L</div> <div>EMXT Chromium, total dissolved SW 6020A ug/L</div> <div>EMXT Manganese, dissolved SW 6020A ug/L</div> <div>EMXT Specific conductance EPA 120.1 uS/cm</div>																	
Location ID	Sample ID	Sample Type	Parent Sample ID	Matrix	Date Sampled												
MW-61-110	MW-61-110-Q219	N		GW	5/23/2019	3.7	280	280	210	23	0.54	0.87	16,000				
MW-62-065	MW-62-065-Q219	N		GW	5/21/2019	1.6	570	560	0.89	13	4.8	4.3	6,200				
MW-62-110	MW-62-110-Q219	N		GW	5/22/2019	3	ND (1.0)	ND (1.0)	150	68	ND (0.05)	ND (0.5)	12,000				
MW-62-190	MW-62-190-Q219	N		GW	5/22/2019	1.3	ND (1.0)	ND (1.0)	780	46	ND (0.05)	ND (0.5)	18,000				
MW-63-065	MW-63-065-Q219	N		GW	5/21/2019	1.5	1.3	2.8	2.5	19	0.93	1	6,700				
MW-64BR	MW-64BR-Q219	N		GW	5/21/2019	4	ND (1.0)	ND (1.0)	960	65	ND (0.05)	ND (0.5)	13,000				
MW-65-160	MW-65-160-Q219	N		GW	5/16/2019	0.69	160	190	76	110	14	9.4	4,000				
MW-65-225	MW-65-225-Q219	N		GW	5/16/2019	2.5	180	160	40	44	2.6	2.3	15,000				
MW-66-165	MW-66-165-Q219	N		GW	5/16/2019	1.2	550	570	ND (0.5)	5.5	25	28	3,900				
MW-66-165	MW-911-Q219	FD	MW-66-165-Q219	GW	5/16/2019	1.2	540	580	ND (0.5)	5.5	25	28	4,000				
MW-66-230	MW-66-230-Q219	N		GW	5/16/2019	9.8	6,400	7,000	3.6	71	11	9	19,000				
MW-66BR-270	MW-66BR-270-Q219	N		GW	5/22/2019	ND (0.1)	ND (1.0)	ND (1.0)	66	10	1.7	ND (0.5)	2,300				
MW-67-185	MW-67-185-Q219	N		GW	5/16/2019	1	2,100	2,200	ND (0.5)	5.7	79	400	7,700				
MW-67-225	MW-67-225-Q219	N		GW	5/16/2019	3.4	3,100	3,300	2.9	48	26	93	7,000				
MW-67-260	MW-67-260-Q219	N		GW	5/16/2019	8.9	800	850	130	69	0.55	ND (2.5)	18,000				
MW-68-180	MW-68-180-Q219	N		GW	5/22/2019	3.1	5,400	6,200	ND (0.5)	36	9.4	11	3,500				
MW-68-240	MW-68-240-Q219	N		GW	5/23/2019	1.6	2,000	2,000	29	30	4.3	4.8	16,000				
MW-68-240	MW-912-Q219	FD	MW-68-240-Q219	GW	5/23/2019	1.7	1,900	2,100	29	31	4.3	4.7	16,000				
MW-68BR-280	MW-68BR-280-Q219	N		GW	5/22/2019	1.2	ND (1.0)	ND (1.0)	150	40	ND (0.05)	ND (2.5)	20,000				
MW-69-195	MW-69-195-Q219	N		GW	5/16/2019	2.2	120	120	0.54	58	10	8	2,600				
MW-70-105	MW-70-105-Q219	N		GW	5/21/2019	3.7	170	170	6	66	4.9	4.6	3,500				
MW-70BR-225	MW-70BR-225-LF-Q219	N		GW	5/21/2019	2	1,600	1,700	1.1	20	3.5	2.8	13,000				
MW-71-035	MW-71-035-Q219	N		GW	5/23/2019	1.2	ND (1.0)	ND (1.0)	18 J	13 J	0.085	0.52	14,000				
MW-72-080	MW-72-080-Q219	N		GW	5/24/2019	10	55	51	77	85	0.37	ND (2.5)	13,000				
MW-72BR-200_S	MW-72BR-200-LF_S-Q219	N		GW	5/23/2019	13	ND (1.0)	ND (1.0)	210	76	ND (0.05)	ND (0.5)	15,000				
MW-73-080	MW-73-080-Q219	N		GW	5/23/2019	1.8	34	35	5.7	30	3.3	4.3	12,000				
MW-74-240	MW-74-240-Q219	N		GW	5/22/2019	8.3	0.55	ND (1.0)	4.5	19	2.1	2.4	800				
TW-01	TW-01-Q219	N		GW	5/24/2019		2,300	2,400		15	15	14	7,000				
TW-04	TW-04-LF-Q219	N		GW	5/16/2019		5.1	4.5	16	42		ND (2.5)	20,000				
TW-05	TW-05-LF-Q219	N		GW	5/20/2019		11	9.9	3.1	31		0.59	12,000				
TW-05	MW-913-Q219	FD	TW-05-LF-Q219	GW	5/20/2019		11	9.6	3	30		0.52	12,000				

<div><div></div><div><div>Design & Consultancy for natural and built assets</div><div>Lab</div></div></div> <div><div>Description</div><div>Method</div><div>Units</div></div>					ASSET Alkalinity, total as CaCO3	ASSET Chloride	ASSET Chromium, Hexavalent	ASSET Chromium, total dissolved	ASSET Manganese, dissolved	ASSET Nitrate/Nitrite as Nitrogen	ASSET pH	ASSET Specific conductance	ASSET Sulfate	ASSET Total dissolved solids	BCLabs Calcium, dissolved	BCLabs Iron, dissolved	BCLabs Magnesium, dissolved	BCLabs Sodium, dissolved
PMP 2019-06 Sampling					SM 2320 B mg/L	EPA 300.0 mg/L	EPA 218.6 ug/L	EPA 200.8 ug/L	EPA 200.8 ug/L	SM 4500-NO3 F mg/L	SM 4500-H+ B PHUNITS	EPA 120.1 uS/cm	EPA 300.0 mg/L	SM 2540 C mg/L	EPA 200.7 mg/L	EPA 200.7 ug/L	EPA 200.7 mg/L	EPA 200.7 mg/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled														
PE-01	PE-01-0619	N	GW	6/5/2019	200	390	ND (0.2)	ND (1.0)	460	ND (0.05)	7.6	2,000	240	1,200	130	430	36	340
TW-03D	TW-03D-0619	N	GW	6/5/2019	160	2,100	450	440	18	2.6	7.3	7,500	480	4,200	200	ND (100)	31	1,300

<div><div><div>Design & Consultancy for natural and built assets</div></div><div>Lab Description Method Unit</div></div> <div>RMP 2019-05 SURFACEWAT Sampling</div>						ASSET Arsenic, dissolved SW 6020 ug/L	ASSET Barium, dissolved SW 6020 ug/L	ASSET Chromium, Hexavalent EPA 218.6 ug/L	ASSET Chromium, total dissolved SW 6020 ug/L	ASSET Iron SW 6010B ug/L	ASSET Iron, dissolved SW 6010B ug/L	ASSET Manganese, dissolved SW 6020 ug/L	ASSET Molybdenum, dissolved SW 6020 ug/L	ASSET Nitrate/Nitrite as Nitrogen SM 4500-NO3 F mg/L	ASSET pH SM 4500-H+ B PHUNITS	ASSET Selenium, dissolved SW 6020 ug/L	ASSET Specific conductance EPA 120.1 uS/cm	ASSET Total Suspended Solids (TSS) SM 2540 D mg/L
Location ID	Sample ID	Sample Type	Parent Sample ID	Matrix	Date Sampled													
C-BNS	C-BNS-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	22	ND (20)	ND (0.5)	4.2	0.4	8.1	1.5	880	ND (5.0)
C-CON-D	C-CON-D-Q219	N		GW	6/19/2019	2.3	100	ND (0.2)	ND (1.0)	45	ND (20)	ND (0.5)	4.2	0.38	8.2	1.6	920	ND (5.0)
C-CON-S	C-CON-S-Q219	N		GW	6/19/2019	2.2	100	ND (0.2)	ND (1.0)	36	ND (20)	ND (0.5)	4.2	0.37	8.2	1.4	910	ND (5.0)
C-I-3-D	C-I-3-D-Q219	N		GW	6/18/2019	2.3	110	ND (0.2)	ND (1.0)	150 J	ND (20)	ND (0.5)	4.4	0.36	8.2	1.6	880	ND (5.0)
C-I-3-D	MW-916-Q219	FD	C-I-3-D-Q219	GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	25 J	ND (20)	ND (0.5)	4.3	0.37	8.2	1.4	890	ND (5.0)
C-I-3-S	C-I-3-S-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	41	ND (20)	ND (0.5)	4.2	0.37	8.1	1.5	900	ND (5.0)
C-MAR-D	C-MAR-D-Q219	N		GW	6/19/2019	2.3	110	ND (0.2)	ND (1.0)	200	44	ND (0.5)	4.2	0.36	8.2	1.8	910	7
C-MAR-S	C-MAR-S-Q219	N		GW	6/19/2019	2.3	110	ND (0.2)	ND (1.0)	190	ND (20)	0.66	4.3	0.38	8.2	1.6	900	9.5
C-NR1-D	C-NR1-D-Q219	N		GW	6/19/2019	2.3	100	ND (0.2)	ND (1.0)	49	ND (20)	ND (0.5)	4.1	0.37	8.2	1.7	910	ND (5.0)
C-NR1-S	C-NR1-S-Q219	N		GW	6/19/2019	2.2	100	ND (0.2)	ND (1.0)	46	ND (20)	ND (0.5)	4.1	0.42	8.2	1.6	910	ND (5.0)
C-NR3-D	C-NR3-D-Q219	N		GW	6/19/2019	2.1	110	ND (0.2)	ND (1.0)	39	ND (20)	ND (0.5)	4.2	0.38	8.2	1.5	910	ND (5.0)
C-NR3-S	C-NR3-S-Q219	N		GW	6/19/2019	2.2	110	ND (0.2)	ND (1.0)	32	ND (20)	ND (0.5)	4.2	0.35	8.1	1.4	920	ND (5.0)
C-NR3-S	MW-917-Q219	FD	C-NR3-S-Q219	GW	6/19/2019	2.2	100	ND (0.2)	ND (1.0)	26	ND (20)	ND (0.5)	4.1	0.36	8.1	1.6	920	ND (5.0)
C-NR4-D	C-NR4-D-Q219	N		GW	6/19/2019	2.2	100	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.1	0.36	8.2	1.4	930	ND (5.0)
C-NR4-S	C-NR4-S-Q219	N		GW	6/19/2019	2.3	100	ND (0.2)	ND (1.0)	31	ND (20)	ND (0.5)	4.3	0.36	8.2	1.7	930	ND (5.0)
C-R22A-D	C-R22A-D-Q219	N		GW	6/18/2019	2.2	110 J	ND (0.2)	ND (1.0)	85 J	ND (20)	ND (0.5)	4.1	0.38	8.2	1.6	890	ND (5.0)
C-R22A-S	C-R22A-S-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	33	ND (20)	ND (0.5)	4.3	0.39	8.2	1.5	890	ND (5.0)
C-R27-D	C-R27-D-Q219	N		GW	6/18/2019	2.1	110	ND (0.2)	ND (1.0)	38	ND (20)	ND (0.5)	4.2	0.39	8.1	1.7	880	ND (5.0)
C-R27-S	C-R27-S-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	24	ND (20)	ND (0.5)	4.4	0.41	8.2	1.6	880	ND (5.0)
C-TAZ-D	C-TAZ-D-Q219	N		GW	6/18/2019	2.3	110	ND (0.2)	ND (1.0)	32	ND (20)	ND (0.5)	4.4	0.37	8.1	1.3	870	ND (5.0)
C-TAZ-S	C-TAZ-S-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	20	29	ND (0.5)	4.3	0.39	8.2	1.4	880	ND (5.0)
R-19	R-19-Q219	N		GW	6/19/2019	2.1	100	ND (0.2)	ND (1.0)	27	24	ND (0.5)	4.2	0.34	8.2	1.5	920	ND (5.0)
R-19	MW-918-Q219	FD	R-19-Q219	GW	6/19/2019	2.2	100	ND (0.2)	ND (1.0)	31	ND (20)	ND (0.5)	4.1	0.37	8.2	1.6	920	ND (5.0)
R-28	R-28-Q219	N		GW	6/18/2019	2.2	110	ND (0.2)	ND (1.0)	51	ND (20)	ND (0.5)	4.3	0.38	8.2	1.4	870	ND (5.0)
R63	R63-Q219	N		GW	6/18/2019	2.4	110	ND (0.2)	ND (1.0)	21	ND (20)	ND (0.5)	4.4	0.35	8.2	1.6	860	ND (5.0)
RRB	RRB-Q219	N		GW	6/19/2019	2.3	100	ND (0.2)	ND (1.0)	50	ND (20)	ND (0.5)	4.3	0.35	8.2	1.7	920	ND (5.0)
SW1	SW1-Q219	N		GW	6/18/2019			ND (0.2)	ND (1.0)						7.3		950	
SW2	SW2-Q219	N		GW	6/18/2019			ND (0.2)	ND (1.0)						7.2		940	



Design & Consultancy
for natural and
built assets

TMP 2019-05 Baseline Sampling

Lab

Description

Method

Units

ASSET

Alkalinity, total
as CaCO3

SM 2320 B

mg/L

ASSET/
BC Labs

Aluminum

SW 6010B

ug/L

ASSET/
BC Labs

Aluminum,
dissolved

SW 6010B

ug/L

BCLabs

Ammonia as
nitrogen

SM 4500-NH3 G

mg/L

ASSET

Antimony

SW 6020

ug/L

ASSET

Antimony,
dissolved

SW 6020

ug/L

ASSET

Arsenic

SW 6020

ug/L

ASSET

Arsenic,
dissolved

SW 6020

ug/L

ASSET

Barium

SW 6020

ug/L

ASSET


Barium,
dissolved

SW 6020

ug/L

Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled										
MW-10D	MW-10D-0519	N		GW	5/17/2019	130	270	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	1.1	1	120	53
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	78	190	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	1.3	1.3	110	110
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	110	520	270	ND (0.2)	ND (0.5)	ND (0.5)	3.6	3.4	85	88
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	97	320	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	4	3.9	38	33
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	110	1,100	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	1.6	1.3	53	34
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	130	1,500	480	ND (0.2)	ND (0.5)	ND (0.5)	5.4	4.9	110	97
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	91	260	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	1.9	2	110	110
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	91	930	ND (50)	0.21	ND (0.5)	ND (0.5)	2.2	1.9	130	110
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	97	270 J	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	3.4	3.5	46	47
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	97	73 J	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	3.3	3.4	44	45
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	93	140	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	3.6	3.2	61	45
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	41	930	ND (250)	ND (0.2)	ND (0.5)	ND (0.5)	3.2	2.7	58	55
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	36	2,000	ND (250)	ND (0.2)	ND (0.5)	ND (0.5)	5.7	4.5	65	49
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	34	500	ND (1,000)	ND (0.2)	ND (0.5)	ND (0.5)	5.2	5	160	160
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	95	260	ND (50)	ND (0.2)	ND (0.5)	ND (0.5)	0.73	0.66	73	76
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	120	150	200	ND (0.2)	ND (0.5)	ND (0.5)	1.1	1	63	60
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	29	400	230	ND (0.2)	ND (0.5)	ND (0.5)	4.3	3.8	56	54
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	44	1,500	240	ND (0.2)	ND (0.5)	ND (0.5)	5	4.4	150	130
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	45	880	240	ND (0.2)	ND (0.5)	ND (0.5)	4.6	4.5	130	130
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	58	1,100	ND (100)	ND (0.2)	ND (0.5)	ND (0.5)	1.3	1.2	190	170
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	64	1,600	ND (100)	ND (0.2)	ND (0.5)	ND (0.5)	4.4	4.4	72	57
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	790	ND (500)	3,600	9.4	ND (2.5)	ND (2.5)	9.1	5.1	220	130

= BC Labs



Design & Consultancy
for natural and
built assets

TMP 2019-05 Baseline Sampling

Lab

Description
Method
Units

ASSET

ASSET
Beryllium,
dissolved
SW 6020
ug/L

ASSET
Boron
SW 6010B
ug/L

ASSET/
BC Labs
Boron, dissolved
SW 6010B
ug/L

ASSET
Bromide
EPA 300.0
mg/L

ASSET
Cadmium
SW 6020
ug/L

ASSET
Cadmium,
dissolved
SW 6020
ug/L


ASSET/
BC Labs
Calcium
SW 6010B
ug/L

ASSET/
BC Labs
Calcium,
dissolved
SW 6010B
ug/L


ASSET
Chloride
EPA 300.0
mg/L

Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled										
MW-10D	MW-10D-0519	N		GW	5/17/2019	ND (0.5)	ND (0.5)	1,300	1,200	ND (2.5)	ND (0.5)	ND (0.5)	150,000	150,000	990
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	ND (5.0)	ND (5.0)	930	890	ND (2.5)	ND (0.5)	ND (0.5)	240,000	230,000	3,200
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	ND (0.5)	ND (5.0)	720	690	ND (1.0)	ND (0.5)	ND (0.5)	140,000	150,000	1,300
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	ND (25)	ND (25)	2,400	2,400	ND (2.5)	ND (0.5)	ND (0.5)	350,000	350,000	3,600
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	780	730	ND (1.0)	ND (0.5)	ND (0.5)	140,000	120,000	490
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	ND (2.5)	ND (2.5)	1,800	1,800	1.4	ND (0.5)	ND (0.5)	170,000	170,000	2,000
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	690	670	ND (2.5)	ND (0.5)	ND (0.5)	180,000	170,000	690
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	700	690	ND (2.5)	ND (0.5)	ND (0.5)	180,000	170,000	690
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	ND (12)	ND (12)	1,100 J	1,100 J	ND (2.5)	ND (0.5)	ND (0.5)	280,000 J	270,000 J	2,600
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	ND (12)	ND (12)	1,200	1,200	ND (2.5)	ND (0.5)	ND (0.5)	290,000	280,000	2,600
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	ND (12)	ND (12)	1,200	1,200	ND (2.5)	ND (0.5)	ND (0.5)	300,000	290,000	2,700
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	1,600	1,300	ND (2.5)	ND (0.5)	ND (0.5)	310,000	270,000	3,700
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	2,200	1,800	ND (2.5)	ND (0.5)	ND (0.5)	430,000	390,000	5,600
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	2,600	2,800	ND (2.5)	ND (0.5)	ND (0.5)	440,000	400,000	6,800
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	ND (0.5)	ND (0.5)	430	300	ND (2.5)	ND (0.5)	ND (0.5)	180,000	150,000	560
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	ND (0.5)	ND (0.5)	520	510	ND (1.0)	ND (0.5)	ND (0.5)	120,000	120,000	370
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	ND (2.5)	ND (2.5)	2,100	2,100	ND (2.5)	ND (0.5)	ND (0.5)	270,000	260,000	3,700
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	ND (2.5)	ND (12)	2,400	2,400	ND (2.5)	ND (0.5)	ND (0.5)	550,000	580,000	6,500
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	ND (2.5)	ND (12)	2,500	2,300	ND (2.5)	ND (0.5)	ND (0.5)	560,000	530,000	6,400
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	ND (0.5)	ND (0.5)	810	740	ND (2.5)	ND (0.5)	ND (0.5)	420,000	370,000	2,100
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	ND (2.5)	ND (2.5)	1,300	1,200	ND (1.0)	ND (0.5)	ND (0.5)	160,000	140,000	2,100
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	ND (2.5)	ND (2.5)	1,900	1,500	ND (2.5)	ND (2.5)	ND (2.5)	420,000	400,000	4,100

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<div><div></div><div>Design & Consultancy for natural and built assets</div></div> <div>Lab Description Method Units</div>						ASSET Chromium, Hexavalent EPA 218.6 ug/L	ASSET Chromium, total SW 6020 ug/L	ASSET Chromium, total dissolved SW 6020 ug/L	ASSET Cobalt SW 6020 ug/L	ASSET Cobalt, dissolved SW 6020 ug/L	ASSET Copper SW 6020 ug/L	ASSET Copper, dissolved SW 6020 ug/L	ASSET Fluoride EPA 300.0 mg/L	ASSET/ BC Labs Iron SW 6010B ug/L	ASSET/ BC Labs Iron, dissolved SW 6010B ug/L
TMP 2019-05 Baseline Sampling															
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled										
MW-10D	MW-10D-0519	N		GW	5/17/2019	130	150	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.2	380	ND (50)
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	0.4	4.4	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.1	200	99
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	5.7	9.5	6.9	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.4	570	150
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	6,900	7,300	7,700	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.7	330	ND (20)
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	3,600	4,000	4,100	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.4	850	ND (20)
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	2,600	3,400	3,000	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.9	1,200	97
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	1,600	1,700	1,600	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	0.97	200	26
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	1,300	1,400	1,400	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1	950	ND (20)
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	2,000	2,100	2,100	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.2	ND (20)	ND (20)
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	2,000	2,200	2,000	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.1	ND (20)	ND (20)
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	2,000	2,700	2,000	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.1	120	ND (20)
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	ND (1.0)	3.8	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.4	1,300	ND (250)
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	530	580	580	0.89	ND (0.5)	1.1	ND (1.0)	4.3	4,300	ND (250)
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	ND (1.0)	3.7	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.3	ND (500)	ND (1,000)
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	28	29	28	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.4	410	ND (50)
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	130	140	140	ND (0.5)	ND (0.5)	ND (1.0)	1.2	0.58	130	ND (20)
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	150	200	150	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.6	630	67
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	1,600	1,600	1,500	0.52	ND (0.5)	ND (1.0)	ND (1.0)	4.5	1,500	55
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	1,600	1,600	1,600	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.5	840	ND (20)
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	ND (0.2)	4.1	ND (1.0)	0.64	ND (0.5)	ND (1.0)	ND (1.0)	3	1,500	ND (100)
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	0.25	4.3	ND (1.0)	0.6	ND (0.5)	ND (1.0 J)	ND (1.0)	4.6	2,100	ND (100)
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	ND (1.0)	61	ND (5.0)	3.5	ND (2.5)	ND (5.0)	ND (5.0)	1.7	13,000	18,000

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for natural and built assets

TMP 2019-05 Baseline Sampling

Lab

Description

Method

Units

ASSET

Lead

SW 6020

ug/L

ASSET

Lead, dissolved

SW 6020

ug/L

ASSET/
BC Labs

Magnesium

SW 6010B

ug/L

ASSET/
BC Labs

Magnesium,
dissolved

SW 6010B

ug/L

ASSET

Manganese

SW 6020

ug/L

ASSET

Manganese,
dissolved

SW 6020

ug/L

ASSET

Mercury

EPA 7470A

ug/L

ASSET

Mercury,
dissolved

EPA 7470A

ug/L

ASSET

Molybdenum

SW 6020

ug/L

ASSET


Molybdenum,
dissolved

SW 6020

ug/L

Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled										
MW-10D	MW-10D-0519	N		GW	5/17/2019	ND (1.0)	ND (1.0)	31,000	32,000	450	410	ND (0.2)	ND (0.2)	8.5	6.9
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	ND (1.0)	ND (10)	31,000	35,000	1,100	1,100	ND (0.2)	ND (0.2)	47	46
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	26,000	30,000	860	960	ND (0.2)	ND (0.2)	18	18
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	ND (50)	ND (50)	14,000	15,000	44	40	ND (0.2)	ND (0.2)	21	21
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	1.7	ND (1.0)	21,000	21,000	42	ND (0.5)	ND (0.2)	ND (0.2)	6	6.1
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	3.1	ND (1.0)	15,000	15,000	280	280	ND (0.2)	ND (0.2)	32	31
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	31,000	32,000	340	350	ND (0.2)	ND (0.2)	18	19
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	31,000	32,000	390	360	ND (0.2)	ND (0.2)	20	19
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	ND (1.0)	ND (1.0)	20,000	19,000 J	22	21	ND (0.2)	ND (0.2)	17	17
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	ND (1.0)	ND (1.0)	20,000	20,000	21	21	ND (0.2)	ND (0.2)	17	17
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	20,000	21,000	57	24	ND (0.2)	ND (0.2)	17	17
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	ND (5.0)	ND (5.0)	23,000	20,000	40	33	ND (0.2)	ND (0.2)	35	34
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	ND (5.0)	ND (5.0)	25,000	21,000	57	7	ND (0.2)	ND (0.2)	49	45
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	ND (5.0)	ND (5.0)	11,000	9,900	30	23	ND (0.2)	ND (0.2)	63	64
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	ND (1.0)	ND (1.0)	28,000	25,000	21	4.6	ND (0.2)	ND (0.2)	3.8	4
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	ND (1.0)	ND (1.0)	22,000	24,000	8.8	7.5	ND (0.2)	ND (0.2)	3.3	3.3
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	ND (5.0)	ND (5.0)	9,300	9,300	210	190	ND (0.2)	ND (0.2)	100	100
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	ND (5.0)	ND (5.0)	14,000	14,000	470	440	ND (0.2)	ND (0.2)	69	72
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	ND (5.0)	ND (5.0)	14,000	13,000	460	440	ND (0.2)	ND (0.2)	71	73
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	ND (5.0)	ND (1.0)	68,000	60,000	720	710	ND (0.2)	ND (0.2)	16	16
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	ND (5.0)	ND (5.0)	11,000	9,300	79	62	ND (0.2)	ND (0.2)	44	46
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	8.6	ND (5.0)	270,000	240,000	880	420	ND (0.2)	ND (0.2)	24	14

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TMP 2019-05 Baseline Sampling

Lab

Description
Method
Units

ASSET

Nickel
SW 6020
ug/L

ASSET

Nickel, dissolved
SW 6020
ug/L

ASSET

Nitrate/Nitrite as
Nitrogen
SM 4500-NO3 F
mg/L

ASSET/
BC Labs
Potassium,
dissolved
SW 6010B
ug/L

ASSET

Selenium
SW 6020
ug/L

ASSET

Selenium,
dissolved
SW 6020
ug/L

ASSET

Silver
SW 6020
ug/L

ASSET

Silver, dissolved
SW 6020
ug/L


ASSET/
BC Labs
Sodium,
dissolved
SW 6010B
ug/L

ASSET

Sulfate
EPA 300.0
mg/L

Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled										
MW-10D	MW-10D-0519	N		GW	5/17/2019	3.5	ND (1.0)	11	14,000	7.5	ND (0.5)	ND (0.5)	ND (0.5)	610,000	370
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	1	ND (1.0)	0.88	ND (500)	0.98	0.8	ND (0.5)	ND (0.5)	ND (500)	540
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	0.86	ND (500)	0.92	0.73	ND (0.5)	ND (0.5)	ND (500)	220
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	9.1	ND (500)	27	28	ND (0.5)	ND (0.5)	ND (500)	900
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	1.1	ND (1.0)	12	ND (500)	9.4	10	ND (0.5)	ND (0.5)	ND (500)	310
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	3.2	ND (1.0)	14	ND (500)	79	78	ND (0.5)	ND (0.5)	ND (500)	830
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	7.9	ND (500)	9.6	9.1	ND (0.5)	ND (0.5)	ND (500)	360
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	ND (1.0)	ND (1.0)	7.1	ND (500)	8.8	8.6	ND (0.5)	ND (0.5)	ND (500)	360
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	ND (1.0)	ND (1.0)	9.3	ND (500)	9.7	11	ND (0.5)	ND (0.5)	ND (500)	520
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	ND (1.0)	ND (1.0)	9.1	ND (500)	9.9	9.5	ND (0.5)	ND (0.5)	ND (500)	520
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	2.4	ND (1.0)	9.1	ND (500)	9.5	9.6	ND (0.5)	ND (0.5)	ND (500)	520
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	1.3	ND (1.0)	0.34	18,000	ND (2.5)	0.64	ND (0.5)	ND (0.5)	2,100,000	490
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	3.3	ND (1.0)	0.69	25,000	ND (2.5)	0.59	ND (0.5)	ND (0.5)	3,000,000	710
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	1.9	ND (1.0)	0.053	41,000	ND (0.5)	ND (2.5)	ND (0.5)	ND (2.5)	4,200,000	650
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	ND (1.0)	ND (1.0)	4.2	9,800	3	3.1	ND (0.5)	ND (0.5)	240,000	160
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	2.2	2.6	18	ND (500)	9.3	9.7	ND (0.5)	ND (0.5)	ND (500)	230
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	1.6	1	6.3	ND (500)	5.9	5.8	ND (0.5)	ND (0.5)	ND (500)	1,000
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	2.9	ND (1.0)	2.9	ND (500)	2.8	3.3	ND (2.5)	ND (2.5)	ND (500)	900
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	1.9	ND (1.0)	3.1	ND (500)	2.7	2.6	ND (2.5)	ND (2.5)	ND (500)	920
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	3.3	1.3	1.2	17,000	1.6	1.7	ND (0.5)	ND (0.5)	1,100,000	450
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	2.5	ND (1.0)	2.4	17,000	3.4	3.6	ND (0.5)	ND (0.5)	1,400,000	470
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	39	ND (5.0)	ND (0.05)	16,000	ND (2.5)	ND (2.5)	ND (2.5)	ND (2.5)	2,600,000	1,400

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<div>  <div> Design & Consultancy for natural and built assets </div> </div> <div> <div>TMP 2019-05 Baseline Sampling</div> </div> <div> Lab Description Method Units </div> <div> ASSET Thallium SW 6020 ug/L </div> <div> ASSET Thallium, dissolved SW 6020 ug/L </div> <div> ASSET Total dissolved solids SM 2540 C mg/L </div> <div> ASSET Total organic carbon SM 5310 C mg/L </div> <div> ASSET Vanadium SW 6020 ug/L </div> <div> ASSET Vanadium, dissolved SW 6020 ug/L </div> <div> ASSET Zinc SW 6020 ug/L </div> <div> ASSET Zinc, dissolved SW 6020 ug/L </div>													
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled								
MW-10D	MW-10D-0519	N		GW	5/17/2019	ND (0.5)	ND (0.5)	2,400	ND (1.0)	3.7	ND (1.0)	ND (10)	ND (10)
MW-B-117	MW-B-117-0519	N		GW	5/15/2019	ND (0.5)	ND (5.0)	5,700	ND (1.0)	ND (1.0)	ND (1.0)	ND (10)	ND (10)
MW-B-33	MW-B-33-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	2,400	ND (1.0)	2.1	1	ND (10)	ND (10)
MW-E-142	MW-E-142-0519	N		GW	5/15/2019	ND (25)	ND (25)	6,300	ND (1.0)	2.3	1.8	ND (10)	ND (10)
MW-E-72	MW-E-72-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	1,400	ND (1.0)	7.2	5.7	ND (10)	ND (10)
MW-F-104	MW-F-104-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	4,500	ND (1.0)	5.4	3	ND (10)	ND (10)
MW-F-60	MW-F-60-3V-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	1,800	ND (1.0)	2.1	1.8	ND (10)	ND (10)
MW-F-60	MW-F-60-LF-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	1,700	ND (1.0)	2.9	1.5	ND (10)	ND (10)
MW-G-57	MW-G-57-0519	N		GW	5/13/2019	ND (0.5)	ND (0.5)	5,400	ND (1.0)	1.1	1.1	ND (10)	ND (10)
MW-G-57	MW-919-Q219	FD	MW-G-57-0519	GW	5/13/2019	ND (0.5)	ND (0.5)	5,200	ND (1.0)	1	1.1	ND (10)	ND (10)
MW-G-82	MW-G-82-0519	N		GW	5/15/2019	ND (0.5)	ND (0.5)	4,900	ND (1.0)	3.2	1.2	ND (10)	ND (10)
MW-L-180	MW-L-180-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	6,400	ND (1.0)	8.1	6.2	ND (10)	ND (10)
MW-L-225	MW-L-225-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	9,800	ND (1.0)	13	7	28	ND (10)
MW-L-245	MW-L-245-0519	N		GW	5/14/2019	ND (2.5)	ND (2.5)	11,000	ND (1.0)	2.6	1.5	39	ND (10)
MW-L-90	MW-L-90-0519	N		GW	5/14/2019	ND (0.5)	ND (0.5)	1,500	ND (10)	2.5	2.2	ND (10)	37
MW-N-129	MW-N-129-0519	N		GW	5/13/2019	ND (0.5)	ND (0.5)	1,200	ND (1.0)	6.7	6.5	ND (10)	ND (10)
MW-N-217	MW-N-217-0519	N		GW	5/13/2019	ND (2.5)	ND (2.5)	7,300	ND (1.0)	3.1	2.2	ND (10)	ND (10)
MW-N-237	MW-N-237-0519	N		GW	5/13/2019	ND (2.5)	ND (2.5)	11,000	ND (1.0)	3.8	1.4	ND (10)	ND (10)
MW-N-237	MW-920-Q219	FD	MW-N-237-0519	GW	5/13/2019	ND (2.5)	ND (2.5)	11,000	ND (1.0)	2.7	1.4	ND (10)	ND (10)
MW-U-183	MW-U-183-0519	N		GW	5/22/2019	ND (2.5)	ND (0.5)	4,600	ND (10 J)	2.8	1.3	ND (10)	ND (10)
MW-U-273	MW-U-273-0519	N		GW	5/22/2019	ND (2.5 J)	ND (2.5)	4,000	ND (1.0)	13	10	13 J	ND (10)
MW-W-31	MW-W-31-0519	N		GW	5/23/2019	ND (2.5)	ND (2.5)	7,600	1.1	15	ND (5.0)	ND (50)	ND (50)

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TMP 2019-05 Post Development Sampling

					Lab Description Method Units	ASSET Chromium, Hexavalent EPA 218.6 ug/L	ASSET Chromium, total dissolved SW 6020 ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled			
MW-U-183	MW-U-183-050819	N	GW	5/8/2019		ND (0.2)	ND (1.0)
MW-U-273	MW-U-273-051019	N	GW	5/10/2019		ND (0.2)	ND (1.0)

TMP 2019-06 Baseline Sampling

						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
						Description	Alkalinity, total as CaCO3	Aluminum	Aluminum, dissolved	Antimony	Antimony, dissolved	Arsenic	Arsenic, dissolved	Barium	Barium, dissolved	Beryllium	Beryllium, dissolved
						Method	SM 2320 B	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020
						Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled												
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		GW	6/30/2019	64	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.2	1	120	120	ND (0.5)	ND (0.5)	620
MW-L-180	MW-L-180-0619	N		GW	6/25/2019	41	100	ND (50)	ND (0.5)	ND (0.5)	3.1	3	53	50	ND (2.5)	ND (2.5)	1,300
MW-L-225	MW-L-225-0619	N		GW	6/25/2019	31	520	ND (50)	ND (0.5)	ND (0.5)	4.6	4.4	45	45	ND (2.5)	ND (2.5)	1,800
MW-L-90	MW-L-90-0619	N		GW	6/25/2019	97	540	ND (50 J)	ND (0.5)	ND (0.5)	0.87	0.72	69	66	ND (0.5)	ND (0.5)	290
MW-M-132	MW-M-132-0619	N		GW	6/25/2019	68	1,300	ND (50)	ND (0.5)	ND (0.5)	2.5	2	190	210	ND (2.5)	ND (2.5)	960
MW-M-193	MW-M-193-0619	N		GW	6/25/2019	50	1,600	72	ND (0.5)	ND (0.5)	2.7	2.5	120	130	ND (2.5)	ND (2.5)	1,500
MW-N-129	MW-N-129-0619	N		GW	6/25/2019	170	290	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	56	56	ND (0.5)	ND (0.5)	440
MW-N-129	MW-922-Q219	FD	MW-N-129-0619	GW	6/25/2019	160	290	ND (50)	ND (0.5)	ND (0.5)	1.2	1	56	56	ND (0.5)	ND (0.5)	450
MW-N-217	MW-N-217-0619	N		GW	6/25/2019	62	340	ND (50)	ND (0.5)	ND (0.5)	6.7	6.3	42	40	ND (2.5)	ND (2.5)	1,900
MW-N-237	MW-N-237-0619	N		GW	6/25/2019	46	420	ND (50)	ND (0.5)	ND (0.5)	4.9	4.6	98	85	ND (2.5)	ND (2.5)	2,100


TMP 2019-06 Baseline Sampling

						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
						Description	Boron, dissolved	Bromide	Cadmium	Cadmium, dissolved	Calcium	Calcium, dissolved	Chloride	Chromium, Hexavalent	Chromium, total	Chromium, total dissolved	Cobalt
						Method	SW 6010B	EPA 300.0	SW 6020	SW 6020	SW 6010B	SW 6010B	EPA 300.0	EPA 218.6	SW 6020	SW 6020	SW 6020
						Units	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled												
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		GW	6/30/2019	630	ND (2.5)	ND (0.5)	ND (0.5)	320,000	320,000	2,300	240	250	230	ND (0.5)	ND (0.5)
MW-L-180	MW-L-180-0619	N		GW	6/25/2019	1,400	ND (2.5)	ND (0.5)	ND (0.5)	300,000	300,000	3,600	ND (1.0)	2.1	ND (1.0)	ND (0.5)	ND (0.5)
MW-L-225	MW-L-225-0619	N		GW	6/25/2019	1,800	ND (2.5)	ND (0.5)	ND (0.5)	440,000	420,000	5,300	490	470	470	ND (0.5)	ND (0.5)
MW-L-90	MW-L-90-0619	N		GW	6/25/2019	270 J	ND (2.5)	ND (0.5)	ND (0.5)	160,000	150,000	550	35	37	33	ND (0.5)	ND (0.5)
MW-M-132	MW-M-132-0619	N		GW	6/25/2019	960	ND (2.5)	ND (0.5)	ND (0.5)	280,000	270,000	2,700	ND (0.2)	2.9	ND (1.0)	ND (0.5)	ND (0.5)
MW-M-193	MW-M-193-0619	N		GW	6/25/2019	1,500	ND (2.5)	ND (0.5)	ND (0.5)	220,000	210,000	3,900	ND (1.0)	4.2	ND (1.0)	ND (0.5)	ND (0.5)
MW-N-129	MW-N-129-0619	N		GW	6/25/2019	430	ND (1.0)	ND (0.5)	ND (0.5)	120,000	120,000	380	140	130	130	ND (0.5)	ND (0.5)
MW-N-129	MW-922-Q219	FD	MW-N-129-0619	GW	6/25/2019	440	ND (2.5)	ND (0.5)	ND (0.5)	120,000	120,000	380	140	130	130	ND (0.5)	ND (0.5)
MW-N-217	MW-N-217-0619	N		GW	6/25/2019	1,900	ND (2.5)	ND (0.5)	ND (0.5)	250,000	220,000	3,800	870	900	900	ND (0.5)	ND (0.5)
MW-N-237	MW-N-237-0619	N		GW	6/25/2019	2,200	ND (2.5)	ND (0.5)	ND (0.5)	440,000	440,000	5,800	1,200	1,400	1,400	ND (0.5)	ND (0.5)

TMP 2019-06 Baseline Sampling

						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
						Description	Copper	Copper, dissolved	Fluoride	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium	Magnesium, dissolved	Manganese	Manganese, dissolved
						Method	SW 6020	SW 6020	EPA 300.0	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020	SW 6020
						Units	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled												
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		GW	6/30/2019	ND (1.0)	ND (1.0)	ND (1.0)	2.5	59	35	ND (1.0)	ND (1.0)	46,000	46,000	3.4	ND (0.5)
MW-L-180	MW-L-180-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	4.5	150	22	ND (1.0)	ND (1.0)	18,000	18,000	ND (0.5)	ND (0.5)
MW-L-225	MW-L-225-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	4.4	490	ND (20)	ND (1.0)	ND (1.0)	18,000	17,000	ND (0.5)	ND (0.5)
MW-L-90	MW-L-90-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	1.4	660	ND (20)	ND (1.0)	ND (1.0)	27,000	25,000 J	22	ND (0.5)
MW-M-132	MW-M-132-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	3.6	2,100	700	ND (1.0)	ND (1.0)	32,000	31,000	1,000	960
MW-M-193	MW-M-193-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	4.3	2,000	310	ND (1.0)	ND (1.0)	12,000	11,000	440	390
MW-N-129	MW-N-129-0619	N		GW	6/25/2019	20 J	ND (1.0)	ND (1.0)	0.54	400 J	ND (20)	ND (1.0)	ND (1.0)	23,000	23,000	4.9 J	ND (0.5)
MW-N-129	MW-922-Q219	FD	MW-N-129-0619	GW	6/25/2019	ND (1.0 J)	ND (1.0)	ND (1.0)	0.58	290 J	ND (20)	ND (1.0)	ND (1.0)	24,000	24,000	1.1 J	ND (0.5)
MW-N-217	MW-N-217-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	4.8	420	ND (20)	ND (1.0)	ND (1.0)	9,300	8,400	80	77
MW-N-237	MW-N-237-0619	N		GW	6/25/2019	ND (1.0)	ND (1.0)	ND (1.0)	4.7	580	ND (20)	ND (1.0)	ND (1.0)	12,000	12,000	290	250

TMP 2019-06 Baseline Sampling

 Design & Consultancy for natural and built assets						Lab	ASSET Mercury, dissolved	ASSET Molybdenum	ASSET Molybdenum, dissolved	ASSET Nickel	ASSET Nickel, dissolved	ASSET Nitrate/Nitrite as Nitrogen	ASSET Potassium, dissolved	ASSET Selenium	ASSET Selenium, dissolved	ASSET Silver	ASSET Silver, dissolved	ASSET Sodium, dissolved
TMP 2019-06 Baseline Sampling						Description	EPA 7470A	SW 6020	SW 6020	SW 6020	SW 6020	SM 4500-NO3 F	SW 6010B	SW 6020	SW 6020	SW 6020	SW 6020	SW 6010B
						Method												
						Units	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled													
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		GW	6/30/2019	ND (0.2)	16	15	53	51	2.5	13,000	1.6	1.5	ND (0.5)	ND (0.5)	1,300,000	
MW-L-180	MW-L-180-0619	N		GW	6/25/2019	ND (0.2)	32	31	ND (1.0)	ND (1.0)	0.38	19,000	0.68	0.8	ND (0.5)	ND (0.5)	2,300,000	
MW-L-225	MW-L-225-0619	N		GW	6/25/2019	ND (0.2)	45	47	ND (1.0)	ND (1.0)	0.55	26,000	0.66	0.68	ND (0.5)	ND (0.5)	4,000,000	
MW-L-90	MW-L-90-0619	N		GW	6/25/2019	ND (0.2)	4	3.8	2.6	1.4	4	9,600	2.9	3	ND (0.5)	ND (0.5)	220,000	
MW-M-132	MW-M-132-0619	N		GW	6/25/2019	ND (0.2)	22	21	ND (1.0)	ND (1.0)	0.11	19,000	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,700,000	
MW-M-193	MW-M-193-0619	N		GW	6/25/2019	ND (0.2)	44	49	1.5	ND (1.0)	0.25	27,000	0.65	0.58	ND (0.5)	ND (0.5)	2,700,000	
MW-N-129	MW-N-129-0619	N		GW	6/25/2019	ND (0.2)	3.6	3.6	7.7	6.1	16	8,200	8.6	9.6	ND (0.5)	ND (0.5)	270,000	
MW-N-129	MW-922-Q219	FD	MW-N-129-0619	GW	6/25/2019	ND (0.2)	3.9	3.8	7.2	6	17	8,300	9.2	9.3	ND (0.5)	ND (0.5)	290,000	
MW-N-217	MW-N-217-0619	N		GW	6/25/2019	ND (0.2)	97	93	ND (1.0)	ND (1.0)	6.7	26,000	6.5	6.5	ND (0.5)	ND (0.5)	2,700,000	
MW-N-237	MW-N-237-0619	N		GW	6/25/2019	ND (0.2)	78	83	2.2	ND (1.0)	3.1	38,000	2.9	2.7	ND (0.5)	ND (0.5)	4,300,000	

TMP 2019-06 Baseline Sampling

						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
						Description	Sulfate	Thallium	Thallium, dissolved	Total dissolved solids	Total organic carbon	TPH as diesel	TPH as motor oil	Vanadium	Vanadium, dissolved	Zinc
						Method	EPA 300.0	SW 6020	SW 6020	SM 2540 C	SM 5310 C	SW 8015B	SW 8015B	SW 6020	SW 6020	SW 6020
						Units	mg/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled											
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		GW	6/30/2019	340	ND (0.5)	ND (0.5)		4,700	ND (1.0)	ND (54)	ND (54)	4.4	3.2	60
MW-L-180	MW-L-180-0619	N		GW	6/25/2019	490	ND (0.5)	ND (0.5)		7,100	ND (1.0)			7.4	6.8	ND (10)
MW-L-225	MW-L-225-0619	N		GW	6/25/2019	680	ND (0.5)	ND (0.5)		10,000	ND (1.0)			8.1	6.9	13
MW-L-90	MW-L-90-0619	N		GW	6/25/2019	160	ND (0.5)	ND (0.5)		1,400	ND (10)			3.2	2.5	ND (10)
MW-M-132	MW-M-132-0619	N		GW	6/25/2019	310	ND (0.5)	ND (0.5)		5,200	ND (1.0)			2.6	ND (1.0)	ND (10)
MW-M-193	MW-M-193-0619	N		GW	6/25/2019	460	ND (0.5)	ND (0.5)		8,800	ND (1.0)			4.8	2.2	ND (10)
MW-N-129	MW-N-129-0619	N		GW	6/25/2019	200	ND (0.5)	ND (0.5)		1,200	ND (10)			7.4	6.7	13
MW-N-129	MW-922-Q219	FD	MW-N-129-0619	GW	6/25/2019	200	ND (0.5)	ND (0.5)		1,200	ND (1.0)			7.2	6.9	ND (10)
MW-N-217	MW-N-217-0619	N		GW	6/25/2019	1,000	ND (0.5)	ND (0.5)		7,200	ND (1.0)			6.6	5.7	ND (10)
MW-N-237	MW-N-237-0619	N		GW	6/25/2019	890	ND (0.5)	ND (0.5)		11,000 J	ND (1.0)			4	2.9	ND (10)

TMP 2019-06 Post Development Sampling

						Lab	ASSET Chromium, Hexavalent	ASSET Chromium, total dissolved
						Description	EPA 218.6	SW 6020
						Method	ug/L	ug/L
						Units		
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled			
MW-M-193	MW-M-193-061419	N		GW	6/14/2019		ND (1.0)	ND (1.0)
MW-M-132	MW-M-132-061519	N		GW	6/16/2019		ND (0.2)	ND (1.0)
MW-M-57	MW-M-57-061719	N		GW	6/17/2019		0.72	ND (1.0)
MW-M-95	MW-M-95-061619	N		GW	6/16/2019		ND (0.2)	ND (1.0)
MW-R-109	MW-R-109-062819	N		GW	6/28/2019		2.5	2.6